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Previous Announcement March 1.

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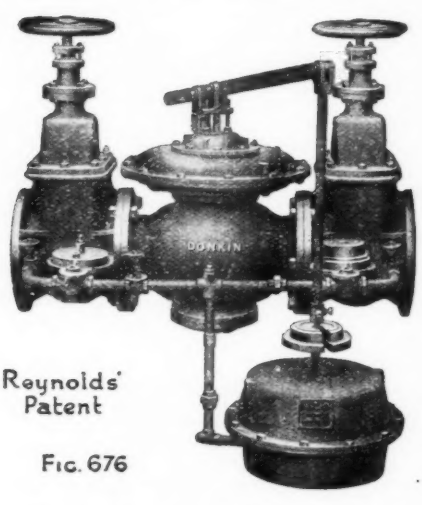

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Fig. 676

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THE GAS JOURNAL

MARCH 8, 1933

Vol. 201. 85th Year No. 3642

A Glance at the Contents—

Technical Signpost to the "Journal."

A technical review of Vol. 200 of the "JOURNAL" covering the October-December quarter is published to-day. [p. 617.]

"Curling" by Gas Light.

A new system of gas lighting the pond used by the Craigie Hill Curling Club in Perth has been completed by the Gas Department of the Perth Corporation. [p. 616.]

Hornsey Gas Company.

A decrease of 4·8% in the sales of gas was reported at the Annual Meeting of the Hornsey Gas Company, held on March 3 under the Chairmanship of Mr. A. M. Paddon. [p. 634.]

Wandsworth and District Gas Company.

The Annual General Meeting of this Company was held at their Chief Offices, Fairfield Street, Wandsworth, on Feb. 28—Mr. Frank H. Jones (Chairman and Managing Director) presiding. [p. 632.]

New Holder in the West of England.

The Plymouth and Stonehouse Gas Light and Coke Company have increased their storage capacity by 5-million c.ft. The new holder, which was inaugurated on Wednesday last, is of the spiral-guided type. [p. 613.]

Lea Bridge District Gas Company.

The Annual Ordinary General Meeting of the Lea Bridge District Gas Company was held at the Offices of the Company on Tuesday, Feb. 28, 1933—Mr. Arthur M. Paddon, M.Inst.C.E., Chairman of Directors, presiding. [p. 636.]

London Section of the B.I.F.

Two attractive exhibits were staged at the London Section of the B.I.F., at Olympia, by the Gas Light and Coke Company and the South Metropolitan Gas Company, both of whom displayed examples of their tar and chemical products. [p. 612.]

Further Sidelights on the Neunkirchen Disaster.

Information given by the surviving workman on the scene of the Neunkirchen gasholder disaster throws further light on the catastrophe, while some interesting thoughts on the matter are given by R. Nübling, Director of the Stuttgart Gas-Works. [p. 611.]

Joint Gas Conference.

We conclude the paper on the Industrial Uses of Gas by Col. W. M. Carr, and publish a report of the discussion. The Presidential Address of Dr. G. C. Clayton and an account of the proceedings throughout the Conference, with the exception of the paper presented by the B.C.G.A., commence on p. 621.

Forthcoming Engagements

March 9.—MIDLAND ASSOCIATION OF GAS ENGINEERS.—Annual Meeting in Birmingham. Presidential Address by Mr. T. H. Poulson. At 2.30.

March 10.—MANCHESTER DISTRICT ASSOCIATION. — Annual General Meeting, Midland Hotel, Manchester, 2.30 p.m. Presidential Address by Mr. G. Dixon.

March 11.—WESTERN JUNIOR ASSOCIATION.—Meeting at Bath. Four short papers.

March 13.—INSTITUTION OF GAS ENGINEERS.—Meeting of Meters Committee, 2.30 p.m.

March 14.—INSTITUTION OF GAS ENGINEERS.—Meetings of Finance Sub-Committee, 10 a.m.; Finance Committee, 10.30 a.m.; Executive Committee of the Council, 11 a.m.; Gas Education Executive Committee, 4 p.m.

March 14.—N.G.C.—Meeting of Central Executive Board.

March 14.—FEDERATION OF GAS EMPLOYERS.—Meeting of Central Committee.

March 15.—INSTITUTION OF GAS ENGINEERS.—Meeting of Board of Examiners, 10.30 a.m.

March 15.—B.C.G.A.—Meeting of Executive Committee, 12 noon, 28, Grosvenor Gardens, S.W. 1.

March 16.—INSTITUTION OF GAS ENGINEERS.—Meeting of Refractory Materials Joint Sub-Committee, 2.30 p.m.

March 16.—SOCIETY OF BRITISH GAS INDUSTRIES.—Meeting, 12 noon, 56, Victoria Street, S.W. 1.

March 16.—SOUTHERN ASSOCIATION (WESTERN DISTRICT).—Meeting at Exeter.

March 17.—LONDON AND SOUTHERN JUNIOR ASSOCIATION.—Meeting. Paper by Mr. C. M. Wearing.

March 21.—I.G.E.—Meeting of Gas Appliances Sub-Committee, 2.30 p.m.

March 22.—SOUTHERN ASSOCIATION (EASTERN DISTRICT).—Meeting at 28, Grosvenor Gardens, S.W. 1, 2.30 p.m.

March 25.—SCOTTISH JUNIOR ASSOCIATION (WESTERN DISTRICT).—Annual Business Meeting, Glasgow. Diploma Thesis by Mr. A. Tran.

March 31.—SOUTHERN ASSOCIATION OF GAS ENGINEERS.—General Meeting at the Hotel Metropole.

April 7.—NORTH BRITISH ASSOCIATION OF GAS MANAGERS.—Spring Meeting in Glasgow.

April 12.—INSTITUTE OF FUEL.—Visit to Beckton Coke Ovens and Greenwich "Metro-Coalite" plants.

April 19.—B.C.G.A.—Meeting of Executive Committee, 12 noon, 28, Grosvenor Gardens, S.W. 1.

April 22.—YORKSHIRE JUNIOR ASSOCIATION.—Meeting at Sheffield. Paper by Mr. H. Wadsworth.

May 5.—NORTH OF ENGLAND ASSOCIATION.—Annual Meeting, County Hotel, Newcastle, at 2 o'clock.

May 5.—LONDON AND SOUTHERN JUNIOR ASSOCIATION.—Annual Business Meeting.

May 6.—MANCHESTER DISTRICT JUNIOR ASSOCIATION.—Visit to Runcorn Gas-Works. Paper by Messrs. H. Goodier and W. E. Saunders.

May 11-12.—EASTERN COUNTIES ASSOCIATION.—Spring General Meeting at Croydon.

May 11.—SOCIETY OF BRITISH GAS INDUSTRIES.—Annual General Meeting and Dinner, Hotel Metropole, London.

May 13.—SCOTTISH JUNIOR GAS ASSOCIATION (EASTERN DISTRICT).—Annual General Meeting at Edinburgh.

May 20.—YORKSHIRE JUNIOR ASSOCIATION.—Meeting at Leeds. Paper by Mr. W. E. Benton.

EDITORIAL NOTES

The 1933 Fair

THE 1933 British Industries Fair has come and gone, but it must not be allowed to pass into history without the meed of praise which it so thoroughly deserves. It is, of course, with Castle Bromwich that we are mainly concerned, and here a final survey of the Gas Industries Section once again revealed among the exhibitors a spirit of optimism and excellent reports of inquiries received and business done. The exhibitors, quite rightly, are unanimous in their praise of the work of the Gas Industries Section Committee, under the Chairmanship of Dr. E. W. Smith, C.B.E., and with Mr. A. W. Smith as Vice-Chairman.

The organization of the Gas Section—which has proved itself a model for other industries in the Fair to follow—is carried along two main lines. Firstly, the aim is to secure the co-operation of all exhibitors in adopting a type of stand as open as is possible having due regard to the nature of their exhibits, and also in adopting, with such modifications as may prove necessary, a uniform colour scheme. Each exhibitor is naturally concerned primarily with his own individual stand, and it is perhaps a little difficult for him to realize the benefits which accrue to him from falling into line with the suggestions of the Committee as regards colour scheme and other points. The most casual visitor to the Birmingham Fair this year must be prepared to admit that the very loyal co-operation of the exhibitors with the Committee on these points had a most wonderful result, in that the Gas Industries Section stood out quite definitely as a co-operative display. The effect of this on the general public cannot be over-estimated, nor must we overlook the effect of this co-operation on the potential buyers. This year, perhaps more than ever before, the visiting gas engineer has felt that he was at home in his own industry as soon as he entered the confines of the Gas Section.

This leads us to the second main purpose of the Section Committee—namely, that of putting the engineers and administrative chiefs of our Industry in close touch with the Gas Section. Our exhibitors are fortunate in having the assistance of the Committee in this work. It is generally agreed that the attendance of engineers this year has been greater than ever, and this was only to be expected, in view of the size of the Section and of the fact that the display of up-to-date goods increases year by year.

The Joint Gas Conference Committee (with Mr. H. C. Smith as Hon. Secretary) are also to be congratulated on putting up such an interesting programme, which in itself was sufficient to justify a visit to Castle Bromwich.

An Impetus to Development

SPECIAL mention should be made of the greatly extended display of industrial gas appliances. We understand that by the end of the first week of the Fair more solid inquiries had been received for industrial appliances than were obtained during the whole period of the Fair last year. During the second week—which included, of course, the dates of the Joint Gas Conference—the representatives on the various industrial stands were often kept busy from first thing in the morning until after the official closing hours of the Fair.

The Fair occurring just now has undoubtedly given very substantial impetus to the development of gas for industrial uses, and the British Commercial Gas Association are to be congratulated on their joint display of industrial appliances, made possible by the ready co-operation of London, Newcastle, Sheffield, and Birmingham. The Industry owes a debt of gratitude to these undertakings for the support they have given to this new development in the Gas Section.

Inquiries among some of those firms who were new exhibitors this year showed them to be enthusiastic regarding the business done on their stands, which had exceeded their expectations. One of them remarked that he was sure almost every gas engineer in the country must have visited the Fair, and he added that he had been in touch with over a dozen undertakings with whom he had not done any previous business. We understand applications from existing exhibitors for increased space have already been received, while some firms who did not exhibit this year have signified their intention of doing so in 1934. We feel confident therefore that next year a still more comprehensive display will be staged for Gas Industry buyers.

It would be unfair to conclude these remarks without a word of praise to the new Honorary Secretary, Mr. W. L. S. Spinks, and his assistants. Mr. Spinks received an excellent coaching under Mr. R. J. Rogers, and has taken every advantage of his training. Exhibitors in the Fair are also indebted to Mr. W. E. Cadwallader, who had charge of the installation of gas supply pipes, not only in the Gas Section, but throughout the Fair. The amount of gas consumed in the kitchens and on the individual stands, as well as for the lighting and heating of the Fair and Executive Offices, was very much in excess of anything in past years, and the Gas Industry may pride itself that it has fully maintained its national reputation of "service" at the Fair which has just closed.

A Call to Action

THE Presidential Address at the Joint Gas Conference at the British Industries Fair in Birmingham last week should provide inspiration both to those who had the good fortune to hear it and to our readers, for it is published *in extenso* in our issue to-day. It was originally intended that Sir Francis Goodenough should preside over the conference, but his illness and operation rendered this impossible; and Dr. G. C. Clayton, M.P., Chairman of the Liverpool Gas Company, consented to occupy the chair. There are two major notes in the President's Address—first, that the Industry is in an extremely strong position and is alive to modern competition and to future possibilities; secondly, that future legislation is likely to bring about fairer conditions for the Industry, which will widen its scope for service.

In regard to the awareness of the Industry, the setting-up of Development Centres in selected places throughout the land, and co-ordination of their work by a Liaison Committee—dealt with in our columns last week—was naturally a topic for comment by Dr. Clayton. Like ourselves, he urges everyone in the Industry to support the scheme, for the time has quite definitely arrived for closer co-operation and co-ordination; no undertaking ought to remain outside the scheme. One fact, however, must be emphasized very strongly—that the industrial load is business which must be sought for and obtained by the initiative of individual engineers and managers; it will not come automatically. In the past we have not pursued the policy of pushing sales of gas for large-

scale uses with the vigour we might have done; but, as Dr. Clayton remarked, it is never too late to mend.

Looking ahead, there is likelihood that our Industry will be freed to carry on business on a fair competitive basis. For years the scales have been weighted against us by obsolete legislation; and it says a great deal for the strength of our Industry that the progress has been so steady in spite of such obstacles. The public want gas. There can, in fact, be no doubt of the preference of the ordinary householder for gas, even in face of such unfair restrictions as the Kettering Gas Act sought to prevent. In this respect Dr. Clayton quoted an instance which is certainly significant. A new block of flats was recently erected by a London Borough Council, and it was at first decided to exclude the use of gas from these flats. Wiser counsels finally prevailed. The tenants were given a choice of fuel for various domestic purposes. No less than 86% chose gas for cooking, and 81% chose gas wash-coppers. "I think," remarked Dr. Clayton, "this provides an object-lesson for some of our Village Hampdens."

The future of the Gas Industry is brighter than ever. Once our Industry is armed with new legislative powers, new avenues of bigger and better business will be unfolded.

Meeting Industrial Competition

THERE is plenty of evidence in the "JOURNAL" to-day that our Industry can both meet and overcome competition from other sources of energy in the industrial field provided its organization is efficiently planned and operated. With some notable exceptions, gas undertakings have until recently neglected the industrial business. We believe that this policy of *laissez-faire* will be abandoned this year and that enormous good will be derived from the new scheme mentioned in the foregoing article. The step is obviously a good one deserving of the keenest support; it is equally obvious that the measure of its success will ultimately depend on the work done by each individual undertaking; and this important point, emphasized by Dr. Clayton, was also stressed during the discussion on the admirable paper by Lieut.-Col. W. M. Carr, on the industrial use of gas, at the Joint Gas Conference in Birmingham last week. It would indeed be fatal if undertakings were to leave to any national organization the work which they should each do individually.

We said last week that industrial business possibilities lie at the door of practically every gas undertaking in the land. In this connection the story told by Mr. A. W. Smith is well worth repeating here. A few years ago the manager of an undertaking in a more or less country district said it was no use thinking he had a field for the industrial use of gas. Dr. C. M. Walter, of Birmingham, made a bet that he could find an avenue there; and on investigation he discovered there was a dairyman who sent his milk churns away to be repaired. Before long the dairyman was persuaded to install a number of gas-heated tinsmiths' sets. Now he is not only doing his own repair work but is actually making his own churns; and he has given a well worth while load to the local gas undertaking. This is a simple story with a moral.

Business does not come along nowadays; it has to be earned, and our competitors, notably the oil companies, have exceedingly good service organizations which help oil users to obtain the most efficient appliances. Out-of-date methods will cut no ice with the industrialist of to-day. We have to prove to him that it is in his best interests to employ gaseous fuel for his heating processes. To afford this proof—and we can afford it—it is necessary to have an understanding of what constitutes the manufacturers' final costs, and appliances and systems of charge which will satisfy the manufacturers' requirements. On these matters there is much useful advice in Col. Carr's constructive and encouraging paper. We agree with the author's view that if gas is to take its true position as the principal industrial fuel of this country it must be backed up by efficient service. We must hold existing business as well as secure new loads. We shall not retain present consumption, in face of competition, unless the apparatus which burns the gas is efficient; and it is a fact that there are too many misapplications of gas. Out-of-date appliances are the gravest menace to the industrial gas business. We must so arrange our industrial departments that all information regarding improvements in the design of apparatus and in practice may be passed on to existing consumers as this information comes to hand. Then, to secure new loads, we must be able to demonstrate the merits of gas at the premises of the consumers and at our own industrial demonstration rooms. Instances are given in Col. Carr's paper of special furnaces designed and manufactured by the Stretford Undertaking as part of the service in the selling of industrial gas. The result of this service is that town gas has been able to oust oil, producer gas, and solid fuel.

Finally, we would emphasize the need for concentrating on the all-in cost of the finished product. As the author says, we have all too often permitted our competitors to compare fuels on a heat unit basis, and to discount the economies and efficiencies of clean gaseous fuel, which can be turned on at will and accurately controlled to give maximum production and maximum quality.

A Plea for Efficiency in Production

THE financial side of the Gas Industry has been brought into prominence during the past few weeks by the publication of proceedings at annual meetings of shareholders. A large proportion of the space in the "JOURNAL" has been devoted to these reports, and we are sure that they have been closely studied. They will have been found to reveal a generally satisfactory position of affairs. In fact, considering the depressed state of industry and the over-taxed condition of the public, the achievements of the Gas Industry deserve something better than so mild a qualification as "satisfactory."

During a "lean" time like the present, the prosperity of so great a branch of public service as the Gas Industry assumes added importance, and those connected with it can justly claim that they deserve well of the community. But there is more to be done—still greater service to be rendered. There are needs to be filled, the fringe of which has been as yet barely touched. At the right price, gas has progress before it greater than anything which it has experienced until now. That is why every nerve has been strained to secure methods of charge which, while inflicting no injustice upon the at present unremunerative consumer, will offer attractive terms to the existing and the potential big consumer; and that is why nothing should be left undone which, by being done, would assist in reducing the cost of gas production.

We are moved to refer once again to this matter by a powerful appeal contributed by Mr. Arthur Valon to the "Correspondence" columns of this issue of the "JOURNAL." We have already, on various occasions, endeavoured in these pages to indicate the difference between "real" and "false" economy—urging the vital need of that cheap supply of gas which must depend upon efficiency in production. It would seem that what has been said by others, as well as by ourselves, has been insufficiently heeded; for Mr. Valon says that "everyone who moves much about the country has the same tale to tell of standards of maintenance lowered, remunerative reconstructions and prudent extensions indefinitely postponed." The circumstances at the moment are peculiar; we all hope they will not recur. They are, however, in various ways favourable for securing that maximum efficiency in production and distribution which must tend towards the provision of the cheap supply of gas recognized by all of us as essential to the fullest development of our Industry.

A week ago there appeared in our pages a report of the conference which took place early in February of representatives of the National Gas Council, the Institution of Gas Engineers, and the British Commercial Gas Association to consider the inauguration of a national campaign for extending the use of gas for commercial and industrial purposes. The scheme contemplated is powerful for good; but its strongest weapon must be the cheapest practicable supply of gas, which can be obtained only by maximum efficiency in production and distribution.

PERSONAL

SIR RUSSELL BENCRAFT.

Sir Russell Bencraft, Chairman of the Southampton Gaslight and Coke Company, celebrated the 75th anniversary of his birth on Saturday last. He received many congratulations and messages of good wishes. As Chairman of the Borough Magisterial Bench on Saturdays, Sir Russell received the heartiest congratulations of his fellow justices and court officials before the commencement of business.

At mid-day Sir Russell was welcomed by a large number of the staff and employees of the Gas Company.

Mr. Aveson (Works Department), Mr. Willis (Distribution Department), and Mr. Lawrence (Staff) expressed congratulations and good wishes for Sir Russell's future happiness, at the same time thanking him for his keen interest in their work and social activities. Mr. E. Dunbar and Mr. F. H. Pitman supplemented the remarks.

Mr. S. E. Whitehead, the Engineer and General Manager, who presided, called on Mr. Warren, one of the oldest employees, to hand to Sir Russell an inscribed silver salver and a breakfast set, subscribed for by the whole of the staff and employees.

Sir Russell, who was received with musical honours and loud cheers, expressed his sincere thanks and said he was proud to be associated with such a fine lot of fellows. He spoke of the excellent relations which had existed, during his 20 years as a Director, between the Directors, management, and employees. He had endeavoured throughout his life to do all he could to promote the happiness of those with whom he worked, and was very proud of the good feeling extended.

* * *

MR. JOHN E. DAW.

Warm tributes to the services rendered by Mr. John E. Daw, J.P., to the Gas Industry in general, and to the Exeter Gaslight and Coke Company in particular, of which Mr. Daw is Chairman, were paid at a ceremony following the annual meeting of the Company on Feb. 28, when the High Sheriff of Devon (Mr. S. M. Manning Kidd) unveiled a portrait of Mr. Daw.

The painting is the work of Mr. G. Hall Neale, of London. There is a tablet at the foot of the gilded frame recording Mr. Daw's name, that he is Chairman of the Exeter Gaslight and Coke Company, and was President of the British Commercial Gas Association, 1930-31. The portrait is to be hung with those of predecessors in the Chairmanship of the Company in the Board Room of the Company's Offices in Southernhay.

Among those who attended the ceremony were Sir Francis Goodenough, C.B.E. (Chairman of the British Commercial Gas Association), who is a Devonian, and Mr. G. Hall Neale.

The High Sheriff, speaking as a shareholder of the Company, said it had been the custom of the Company for many years to have portraits of their Chairmen hung in the Board Room. The artist, Mr. G. Hall Neale, was very well known as a successful portrait painter of many eminent men, among whom were Lord Birkenhead and Sir Bindon Blood.

A lawyer by profession, Mr. Daw ceased active practice in 1902, when he became Registrar of the Exeter, Newton Abbot, and Torquay County Courts, following his grandfather and father in the Exeter appointment. He had always been keenly interested in local government matters and was, for thirteen years, on the Exeter City Council and the Exmouth Urban Council. He was Chairman of the latter body at one time, and, after a long break, had once again become a member of the Exmouth District Council. Mr. Daw joined the Board of the Exeter Gaslight and Coke Company in 1917, and was elected Chairman in 1927. He had always taken a keen interest in the national organizations of the Gas Industry, was President of the British Commercial Gas Association for the year 1930-31, and now represented that body on the Executive Board of the National Gas Council.

Sir Francis Goodenough said he was glad of that opportunity of paying his tribute to Mr. Daw personally and officially. Both for the British Commercial Gas Association and the National Gas Council, Mr. Daw had done remarkably fine service, and would do so for many years. "We value his sane commonsense, his ripe wisdom, and his ever readiness to co-operate and work with the team for the benefit of all. He is a fine co-operator as well as a very able leader," added Sir Francis. During his office as President of the Commercial Gas Association, he, as Chairman, received most valued help from Mr. Daw. The finest thing in the English language that could be said of one was that he was a gentleman. No one better fulfilled that description than Mr. Daw. [Applause.]

Mr. Daw, acknowledging, expressed gratitude to the High Sheriff and paid a tribute to the work of Sir Francis, congratulating him upon the excellent recovery he was making after his recent serious operation.

* * *

By the casting vote of the Lord Mayor (Sir Percy Greenaway), Mr. Leslie C. B. Bowker, M.C., O.B.E., aged 45, Legal Secretary to the Law Officers of the Crown, was elected Remembrancer to the Corporation of London at a meeting of the Court of Common Council in Guildhall on March 2. Among other Lawyers selected from a large number of candidates by the Officers and Clerks Committee for submission to the Court for election was Mr. J. R. Willis Alexander, M.A., LL.B., F.C.I.S., F.I.Arb., aged 35, Barrister-at-Law, Secretary to the Institution of Gas Engineers.

* * *

Mr. James William Wilson, of Leeds, Managing Director of Wilsons & Mathiesons, Ltd., gas engineers, Armley, and a Director of Radiation Ltd., left £91,485 (net £89,755).

* * *

The appointment of Chevalier of the French Legion of Honour has lately been awarded to M. Auguste Sellie, the President of the Association Technique de l'Industrie du Gaz en France, and M. Joseph Doumayron, the Director of the Gas-Works at Nice. M. Georges Vautier, the President of the Union Syndicale de l'Industrie du Gaz en France, has also been made an Officer of the Legion.

* * *

Mr. Thomas E. Richmond, who has been appointed Commercial and Sales Superintendent of the Blackburn Corporation Gas Department, has spent over 20 years in this branch of municipal activity, and many tributes have been paid to his diligent service. He started under Mr. Sam Ogden, then Engineer and Manager, and after serving with the Navy during the war was appointed Chief Clerk in 1919, just prior to Mr. G. P. Mitchell taking over the Engineership. He co-operated with this chief official in the work of re-organizing and centralizing the works and the distribution of gas. In 1924 Mr. Richmond was appointed Commercial Assistant to Mr. Mitchell, at the same time retaining the duties of Chief Clerk, and he has held the dual position up to the present time.

CORRESPONDENCE

Gas for Commercial and Industrial Purposes.

SIR,—In your otherwise excellent report of the Joint Conference on Gas for Commercial and Industrial Purposes, you report me as having " pointed out that he had been largely responsible for the proposals under consideration."

May I request your permission to disclaim any part whatever in the formulation of the proposals before the meeting?

The new policy which the meeting was called for the purpose of inaugurating has evolved irresistibly through the magnificent work done for the Industry by the Gas Light and Coke Company, through Watson House, and the Birmingham Corporation Gas Department, through their Industrial Laboratories.

Few in the Industry can claim even to have realized the need for such institutions; but never did supply create so rapid a demand, and it was not until they were overwhelmed with appeals for assistance from other gas undertakings that the new scheme was formulated and the conference held, to start what we hope will develop into a source of new life for the Gas Industry.

We can never convey adequate thanks for the work of Watson House and the Birmingham Laboratories, but it is to be hoped that the one method open to all gas undertakings to express gratitude to the pioneers of the movement will be employed, and that is to give enthusiastic support to the new movement.

The matter to which I referred, and which apparently misled your reporter, was that I had been instrumental in causing an effort to be made to ascertain the possibilities of the State itself as a consumer of gas, and to find means to encourage the use of gas in State Departments. It is clear that the Gas Industry needs an entirely new sales equipment, and the Resolution sent to the conference from a large and representative meeting of Yorkshire engineers was intended to direct attention to this need and suggest how it could be met. It reads as follows:

" That this meeting is in favour of setting up an Industrial Gas Section in Yorkshire for the collation and furnishing of information to members, on request, regarding the use of Gas for Industrial and Large-Scale Purposes. Also, that we are in favour of a Central Bureau provided same is controlled by a special and independent organization, and this meeting also records its opinion that an urgent need of the Industry is a corps of expert technically qualified salesmen, whose duty it shall be to represent Gas to Manufacturers of Plant, Engineers, and Architects responsible for the design and carrying out of works calling for such services as gas can perform, and that such corps shall function also as a centre, which should secure and be prepared to provide information with regard to the application of gas, and the value in such cases of gas thermal energy, as compared with other fuels, to all associated gas undertakings."

It is at present no one's job to be Gas Salesman to the State, to County Authorities, and to the various interests mentioned in the Resolution, and it is hoped that the need has only to be pointed out to be filled at an early date. That this cannot possibly be too soon is the opinion of—

Yours, &c.,
H. E. BLOOR,
Engineer, Manager, and Secretary.

York Gas Company,
Davygate, York,
March 4, 1933.

Spending for Efficiency.

SIR,—On many occasions since the autumn of 1931 you have pointed out in Editorials that the Government call for economy was not intended to discourage spending on remunerative works; and you have quoted the Prime Minister and Chancellor of the Exchequer in support of your exhortations to the Industry not to avoid expenditure where it will give a proper return in increased efficiency.

Yet it would seem that your words have fallen on stony ground. Everyone who moves much about the country has the same tale to tell of standards of maintenance lowered, remunerative reconstructions and prudent extensions indefinitely postponed.

Why is this? Lack of confidence no doubt accounts for the general lowering of spending where it is not due to actual lack of means. But surely this does not apply to the Gas Industry, which has maintained its prosperity undiminished. It is indeed astonishing that industrial depression and lower incomes should have had such a small effect on gas output. The reports of annual meetings now appearing in your columns show that times are not bad for us. Even if the future were to hold more difficult conditions, now is the opportunity to prepare for them.

May I quote from your Editorial of Oct. 26, 1932:

> " The best security against competition from other forms of heat, light, and power is to offer the consumer modern equipment and a cheap supply of gas, which in its turn depends on modern gas-making plant."

Not since pre-war days has there been such a favourable opportunity to modernize or to extend. Prices are down in some cases to pre-war level or below, and capital can be obtained more cheaply than for twenty years past. If we postpone work we may be caught on a rising market, for economists, however much they disagree on many things, seem certainly to agree that returning prosperity must be preceded by a rise in the price level; and there can be no doubt at all that, as confidence recovers in general industrial investments, higher rates of interest will be required for both local loans and gas capital. In these circumstances, therefore, to lower the standard of maintenance or to postpone expenditure on reconstruction is opposed to the permanent interests of the Industry; and, I venture to assert, to the interests of the Nation.

When, in face of threatened disaster to the national finances, the Government called for economy, it was widely interpreted as a general call for lessened spending. Such an interpretation was, perhaps, natural, possibly intended, for this lessened spending certainly helped to increase the demand for gilt-edged securities, and assisted to make the conversion operation a success.

Unfortunately, the Government campaign seems to have resulted in a widely-held although sometimes sub-conscious belief that prosperity can be regained by parsimony; a belief which is wholly pernicious. One would have thought that it was so easily demonstrated as to be obvious that if every public body, private company, and individual reduced their spending to bare necessities, most of the population would be unemployed, dividends disappear, all incomes be reduced or vanish, the yield of taxation fall, and the Budget be not only unbalanced but unbalanceable. Indeed, the prosperity of a nation can fairly be estimated at any particular price level by the total amount spent by its members.

When for any reason an expenditure is not made, the effect is cumulative; it reduces the spending power of those to whom payment would have been made, and so on all along the course of what should have been a fertilizing stream. Unfortunately, in the world economic debacle, spending power has been diminished wholesale, and the effect of this cumulative action is seen in still increasing unemployment. The stream has been dammed and the sluices must be opened by increased spending if prosperity is to return and unemployment fall.

Happily, people are beginning to realize the truth of this, and organizations are springing up in many towns with the object of inducing those who have spending power to exercise it. Will not the Gas Industry help the good work along?

One word more. It ought not to be necessary, but perhaps it is as well, to disclaim any advocacy of indiscriminate expenditure—that is, spending for the sake of spending. Economy, which to me means getting as much as possible of what you want in return for what you spend, is always desirable, and never more desirable than now. But avoidance or postponement of expenditure is not necessarily economy; it may be the wildest extravagance.

Yours, &c.,
ARTHUR VALON.

5, *Victoria Street,*
Westminster, S.W. 1,
March 3, 1933.

THE NEWS OF THE WEEK

The Plymouth Gas Committee have reduced their charges for gas from 3s. per 1000 c.ft. to 2s. 11d. per 1000 c.ft.

The Offer Made by South-Eastern Gas Corporation, Ltd., to holders of ordinary shares and stock of the Dover Gas Company has been accepted by the needed proportion and has therefore become effective.

Six Officials of the Clitheroe Corporation have between them 212 years of service. The official with the longest service is Mr. R. Barrett, Engineer and Manager of the Gas-Works, who has served the Corporation for 53 years, 40 of which have been in his present capacity.

British Coals—their origin, composition, and classification is the subject of an article by Mr. A. L. Curtis in the current edition of "Sands, Clays, and Minerals." An interesting coloured plate illustrates different types of coal. The same issue contains a further article on refractory cements, by Mr. W. O. Lake, M.I.Mech.E.

Record Breaking in Gas Output.—The gas sent out from the Granton Gas-Works of the Edinburgh Corporation for the past month amounted to 383 million c.ft., being an increase of 31 million c.ft.—8½% over the same period last year, and making a record output for the month. It is nearly 3% in excess of the previous record.

New and Reduced Charges for gas required by industrial concerns have been introduced by the Liverpool Gas Company. The first 475 therms are charged at 7·4d. per therm per quarter; for the next 525 therms, 6·4d.; next 1000, 6·2d.; next 2000, 6d.; next 3000, 5·8d.; next 5000, 5.6d.; next 10,000, 5·4d.; next 20,000, 5·2d.; and next 40,000, 5d. For all additional therms the price is 4·8d. per therm. The old rate of charge was 7·4d. per therm.

The Cannon Cookery Book, compiled by Mrs. D. D. Cottington-Taylor (who is a well-known authority on cooking), and published by Messrs. Cannon Iron Foundries, Ltd., of Deepfields, nr. Bilston, Staffs, is a well-produced and interesting publication, containing a wide range of useful recipes, together with particulars regarding the proper care and maintenance of the gas cooker and the proper use of the "Autimo" oven heat control.

Imperial Continental Gas Association.

The Imperial Continental Gas Association, stated the "Financial Times" in a recent "Potential Investments" column, was established in 1824 and incorporated by special Acts in 1853 and subsequently. Under the Act of 1929, repealing all previous Acts, the Association is authorized to supply directly or in conjunction with other companies light, heat, and power in foreign countries and the British Dominions. Gas is supplied in certain towns in Holland, Belgium, and Czechoslovakia, and electricity in Brussels, and considerable interests are held in other Continental public utility undertakings. In fact, for all practical purposes, the Association is a holding company.

Despite the general depression, the total consumption of gas and electricity in the areas supplied both directly and indirectly increased each year down to 1931-32, when there was a slight falling off.

On account of the current financial year an interim dividend of 5% was paid on Nov. 29, equal to 10% on the old capital. At the close of 1930-31 investments in subsidiary and allied companies stood at £3,642,718, and their book value, as shown above, is given after capitalizing part of the surplus on revaluation—namely, £2,800,000—which was utilized in paying the 100% scrip bonus.

The authorized and issued capital stock is £5,600,000, which is officially quoted at 215, to yield 5% on the basis of a dividend of 10¾%.

There is also outstanding £222,831 (including premium on redemption at 105% on six months' notice) of 3½% debenture stock, now quoted at 94, to return a flat yield of 3⅝% per annum.

Institution of Gas Engineers.

Members of the Institution are invited to attend a meeting of the Illuminating Engineering Society at the Institution of Mechanical Engineers, Storey's Gate, St. James' Park, London, S.W. 1, on Tuesday, March 14, at 7 p.m., when Dr. Ing. N. A. Halbertsma will deliver an address dealing with "Progress in Illuminating Engineering Abroad," which will be followed by a discussion.

Light refreshments will be provided at 6.30 p.m.

Tickets of admission may be obtained from the Secretary of the Institution of Gas Engineers, 28, Grosvenor Gardens, London, S.W. 1.

Members of the Institution are also invited to attend a meeting of the Royal Society of Arts, John Street, Adelphi, W.C. 2, on Wednesday, March 15, at 8 p.m., when Prof. William A. Bone, D.Sc., Ph.D., F.R.S., Professor of Chemical Technology (Fuel and Refractory Materials) at the Imperial College of Science and Technology, will read a paper on "The Chemistry of Hydrocarbon Combustion," which will be illustrated by lantern slides and experiments.

Prof. Henry E. Armstrong, Ph.D., D.Sc., F.R.S., will preside.

Tickets of admission may be obtained from the Secretary of the Institution of Gas Engineers.

Lighting in Edmonton.

A Special Meeting of the Edmonton Urban District Council which had been arranged to consider quotations and particulars of schemes which had been obtained from the North Metropolitan Electric Power Supply Company and the Tottenham and District Gas Company for improved lighting in Angel Road, the Light Railway Road, Bush Hill Park, and the Cambridge Arterial Road, was postponed.

At the ordinary meeting, the Works, Highways, General Purposes, &c., Committee reported that in connection with the question of the improvement of the lighting in Angel Road, Light Railway Road, and Cambridge Arterial Road, an invitation had been received from the North Metropolitan Company for members of the Council to see some typical examples of public lighting in adjoining districts, showing in actual use some fittings similar to those contained in their tender, and instructions had been given for all members of the Council to be notified of the invitation and for the necessary arrangements to be made for the members who accepted.

The Committee also reported that the lamps on the North Circular Road were at present on the southerly side only; now that a gas main was laid on the north side the lamps could be staggered; this would improve the lighting, and the Gas Company had offered to carry out the work free of charge. The Council adopted the Committee's recommendation for the work to be put in hand.

Cheltenham Amalgamation.

The shareholders of the Cheltenham and District Gas Company on Wednesday last agreed to amalgamate with the Pershore Gas Company.

In his statement in connection with the purchase of Pershore and District Gas and Lighting Company, Mr. S. G. Wood (Chairman of the Directors of Cheltenham Gas Company) said the chief inducement which led them to consider seriously the scheme was the insistent demand for gas by the villages between Tewkesbury and Pershore. Extension, however, beyond Bredon, which they had planned as their limit, did not appeal to them as an economic proposition unless they could obtain the "mainhead" which the town of Pershore could provide.

Pershore Gas Company's average output was about 15 million c.ft. per annum, and the present price was 6s. per 1000 c.ft. less certain discounts.

The Company were in possession of good mains and services, and reasonably adequate storage capacity. The

paid-up capital consisted of 1000 £5 shares, and they had paid their shareholders the substantial return of 8% for many years past.

In those circumstances the Cheltenham Company felt they could do no less than offer to issue to the Pershore shareholders such a sum of 5% consolidated ordinary stock of the Cheltenham Company as would produce an equivalent return—*i.e.*, £8000—and, of course, undertake to compensate the Directors and other officials of the Company properly.

Their offer was eventually accepted subject to the necessary approvals. The agreed figure in respect of compensation to the Directors and officials was £1380, and the terms of the transaction were embodied in a draft agreement.

The scheme would necessitate, he added, the laying from Bredon of about seven miles of 6-in. main, and would call for special technical arrangements for the adequate maintenance of the supply owing to the distance. The total estimated cost was about £25,000, and they might feel assured of receiving a return for their outlay which would amply repay the enterprise.

Not more than two years ago they bought out the Tewkesbury gas service, and their experience in that town since encouraged him to ask for their approval of this transaction with Pershore with still greater confidence.

The Aim of Electrical Engineers.

A Remarkable Statement.

"Gas has got to be stamped out, and steam must be made obsolete," was the remarkable statement expressed by Councillor T. James, Chairman of the Swansea Corporation Electricity Committee, in emphasizing the aim of the electrical industry.

He was speaking on the occasion of the Twelfth Annual Dinner of the West Wales Section of the Electrical Power Engineers' Association at the Mackworth Hotel, Swansea, on Feb. 25, when he proposed the toast of "The Electrical Industry." The future success of the industry, he said, depended on them, as they had a vast field of development before them. Electricity must come down in price and electrical equipment also. The whole of the country had got to be run on electricity—not only the towns, but the agricultural areas also.

Unfair Discrimination by Brighton Municipality.

Tenants Forced to Use Electricity.

The unfair discrimination exercised by the municipal authorities in favour of electricity on housing estates at Brighton was referred to by Mr. A. M. Paddon, Chairman of the Brighton, Hove, and Worthing Gas Company, at the General Meeting of the Company last week.

This Company, said Mr. Paddon, had its special grievances against their local authorities. What they complained of was that the Brighton Municipality, in regard to houses built with public money and provided for public convenience, should limit and restrict the occupiers to the use of electricity. The tenants were not allowed to have a free choice in that question. That was a general complaint which obtained more or less throughout the country, and that practice was effected in divers ways. In many cases there was a definite prohibition and exclusion of gas from municipal building estates. That had already brought its Nemesis, had been curtailed and was breaking down.

An Ingenious Method.

In their particular instance, the method was more ingenious and disingenuous. As a condition precedent to obtaining a municipal house, the tenant was required to enter into an agreement to pay 2s. 6d. a week for the privilege of using electricity; there was no electricity given for that. The expenditure of 2s. 6d. a week in connection with a house of that type would not only give the tenant all he required in the way of light, heat, cooking, and general domestic requirements with gas, but the use of the necessary apparatus as well.

The carrot dangled in front of the donkey was that after paying that 2s. 6d. he could have electricity at ½d. a unit, but the man was held hopelessly down by having to part with a sum which would have provided him with all his requirements in gas and gas appliances. He considered that most inequitable; he did not think it could be defended, and he thought that the general judgment of the country was against it.

"After all," added Mr. Paddon, "we are one of the largest ratepayers in Brighton. Why should we be discriminated against in this way because the Corporation wishes to force upon certain elements of the community, who happen to be in their power, a commodity in which it is financially and commercially interested? No one can agree that it is a fair proposition."

Use of Coke in Open Grates.

The subject of the use of coke in open grates has been freely discussed in "The Times," and among the contributors has been Mr. Frank C. Ryde, who has explained the method by which he has successfully burnt coke in ordinary unaltered fire grates for the last fifteen or sixteen years. The only appliance he uses consists of two blowers of sheet iron, hung one above the other on two small round-headed screws fixed in the top of the frame of the grate. The upper blower has the bottom edge turned up as a hook, and the lower has the top edge hooked so as to hang on the upper one. Both are used in lighting the fire, but the lower one is removed when the paper and wood are well alight. Both are removed when the coke begins to burn. Mr. Ryde uses no coal in lighting. He points out that boiler nuts should be employed.

A New Cleanser.

"Kleenup"—a new labour-saving cleansing material manufactured by Messrs. Kleenup-Astrah Products, of St. Helens, Lancs. (Head Office, 7, High Street, Sutton, Surrey)—is creating a considerable amount of interest in the Gas Industry. Though adaptable to an almost unlimited range of cleansing applications, the value of "Kleenup" in the sphere of gas cooker maintenance is becoming increasingly recognized.

The feature of "Kleenup" which will commend itself to gas engineers and managers more, perhaps, than any other is that it is non-caustic. A demonstration of the material recently enabled us to appreciate its simplicity of application—a little on a dry cloth is all that is required—and its speed of operation. Its merits, we understand, have also been demonstrated to the British Commercial Gas Association, who will be pleased to pass on their opinion to any gas undertakings interested.

The base of this product is pumice. It is sold in the form of a white paste in tins for household use, or in 7-lb. drums for large kitchens, gas showrooms, stove repair shops, &c. "Kleenup" in liquid form is also available for gas cooker de-greasing plants. The product is stated to be both non-inflammable and non-poisonous.

For many other cleansing purposes, both domestic and industrial, "Kleenup" can be employed with complete success. Grease and grime are easily wiped away; dirt, tar, oil and shellac spots disappear, while it brings up enamel and metal work like new. For motorists and engineers it is most useful, while it can be used with perfect safety for cleaning the hands.

The manufacturers invite those who are interested in this new product to write for a free sample and test for themselves whether or not the claims put forward for it are well-founded.

Street Lighting in Weymouth.

Interesting Summary in Local Press.

The relative advantages of electricity and gas before now have been the subject of more than one debate in the local Council Chamber. But, says the "Southern Times and Dorset County Herald," although the decision was taken long ago that the Corporation's own electricity should supplant another form of illuminant owned by a private company, it is a very debateable point still which is the more effective and the more economical system of public lighting. When it is remembered that in 300 towns in this country there are over 13,000 miles of streets lighted by gas as compared with 3000 miles lighted by electricity no one can argue that electricity has yet reached the stage when it can claim anything like supremacy in the field of public or street lighting, because present-day returns do not support such a claim.

In saying this, however, we are not seeking to establish any sort of argument for changing the public lighting policy of the Weymouth Town Council, which is irrevocably determined in so far as the majority of the public lamps are concerned. There was a resolution passed many years

THE NEWS—continued.

ago that electricity should be substituted for gas for *all* street lighting. It has not been fully operative and up to the present time the Weymouth Consumers Gas Company have been allowed to provide the lighting for about 150 lamps, while the Electricity Committee have converted about 600 lamps into electricity. It has now been decided that the change-over shall be made complete without any further delay and it is understood that instructions have been given for 102 of the lamps to be disconnected. The position to-day is this. Competition between gas and electricity has had the effect of improving the range and serviceability of public lighting more than anything else could possibly have done. That is acknowledged by many in the Corporation to-day.

What we do suggest, continues the newspaper, is that no valid reason exists why the Gas Company should be put out of business altogether and denied the opportunity of showing—as they certainly have done in more than one stretch of road in Weymouth—what modern gas lighting is capable of doing. On the contrary, on the grounds of equity and fair play and on the good sound principle of "live and let live" we could suggest just reasons why the Company should be left in undisturbed possession of one small field of public service and why they might very well be invited once more to tender a price for lighting, maintaining, and equipping the 140 lamps that so far have been left to them. Gas and electricity between them are developing on more or less parallel lines, each performing its own special functions, both undertakings most efficiently managed, and both rendering good service to the community competing with each other, but without fear or favour, malice or ill-will. Each is marching with the times with a keen and lively anticipation of the possibilities of the future. Both have had years of steady progress. The Electricity Department is very shortly to launch a spectacular form of enterprise in the shape of new showrooms in the Westham Road. The Gas Company during the past three years have spent over £100,000 on extensions to their works, which represents a considerable amount of capital invested in the town. That means increased employment, and it also establishes the Company as one of the largest rate-paying concerns in the Borough.

The Town Council would be doing the fair and just thing if it left to the Company the unrestricted field of opportunity that it seeks in one small area of street lighting. It would be a generous and public gesture and the happiest expression of goodwill from one commercial undertaking towards another.

Bookings for Film "Tar."

The following is the ninth list of bookings for the film of the British Road Tar Association. In each case the film will be shown for three days:

March 20.—Cinema, Soham.
,, 23.—Palace, Perranporth.
,, ,, Cinema, Faringdon.
April 10.—Exchange, Wallingford.
,, 13.—Imperial, Kilmarnock.

Snow Damage at Yorkshire Gas-Works.

Weight of snow after the recent three days' blizzard which spread extensive damage in many parts of West Yorkshire, caused the collapse of a gasholder at the Low Moor Works of the Bradford Corporation Gas Department. The mishap was due to a heavy mass of snow sliding off the top of the holder on to one of the supporting standards, which was fractured and caused the collapse of the holder, resulting in an escape of some 144,000 c.ft. of gas. The holder, which was one of the smallest in the Bradford district service and one of the oldest, was constructed 60 years ago and of the water-sealed type. Its capacity was 170,000 c.ft., but it was not full at the time; and as this holder was not in use at the period of the collapse no interference with supply to consumers occurred.

At the works of the Drighlington and Gildersome Gas Company the weight of snow sliding to one side of the crown of a holder caused a tilt which resulted in a leakage of some 150,000 c.ft. of gas. The holder was the oldest in the Company's service. The carriage on the tilt side was broken and bolts were wrenched from the top of the holder. The management, anticipating possibilities of mishap with the old holder, had emptied half the gas from it during the preceding day, and the holder was only half full at the time of the accident.

At the works of the Yeadon and Guiseley Gas Company the heavy load of accumulated snow caused the collapse of the roof of the coke shed, but nobody was working in the shed at the time and there was no personal injury.

Development and Progress of the Eastbourne Gas Company.

In a series of articles appearing in the "Eastbourne Chronicle" relative to the town's old-established businesses, a recent edition contained an interesting sketch of the birth, growth, and development of the Eastbourne Gas Company.

Inspired probably by the coming of the railway into the town in 1849 Mr. Robert Cooper, a far-sighted man, who became the first Chairman, suggested that a company should be formed for the purpose of making and supplying gas, and consulted Mr. Whiteman, then the only solicitor in Eastbourne.

A canvass was made of the principal inhabitants and an encouraging response was received, promises to take up shares being readily made. Mr. Cooper and Mr. Whiteman then communicated with Mr. John Rutter, Manager of the Brighton Gas Company at Black Rock.

Let us continue in Mr. Cooper's own words: "Mr. Rutter visited Eastbourne, and I took him over the town, pointing out the principal points where gas was required. . . . On reaching Diplock's Hotel no more houses were to be seen for some distance. Mr. Rutter made a sudden stop at this point and strongly advised that we should abandon our project. But I told him we were determined to have gas in the town, and we thereupon continued our journey till Junction Road was reached, when we came upon the next houses in that direction."

Fortunately a decision was made to prepare a scheme and a first meeting of promoters was held in March, 1851. It is an interesting and remarkable fact that extraordinary longevity has been a noticeable feature in most of those associated with the Directorate of the Eastbourne Gas Company. The original capital of the Company was fixed at £3000 and the price charged to consumers was 7s. per 1000 c.ft. This was quite a reasonable figure as many other undertakings charged as much as 12s. 6d. per 1000 c.ft.

The First Works.

In 1852 the first works were built on a site near the railway station. Difficulty was experienced and considerable expense caused by a strong spring of water in the excavations, and a steam pump had to be brought from London. At length the works were completed, and gas was distributed, except to the Old Town district. The inhabitants there were not supplied with gas for three or four years afterwards, as there was then a gap of nearly a mile between the works and house property in that part of the town. On August 15, 1853, it is recorded that there were 100 private consumers.

As regards street lighting the only outdoor lamp for quite a long time was outside Trinity Church, and this was only lighted on Sunday nights!

The works continued near the Railway Station until 1868, when they were transferred to the present site which was then "two miles out of the town on Pevensey flats." These were enlarged in 1878. The Chairman was then Dr. G. A. Jeffery, and the Secretary and Solicitor, Mr. J. H. Campion Coles, the offices being at Claremont Chambers, near Memorial Square.

In 1882, the original capital of £3000 had grown to £81,000 with an output of 86 million c.ft. of gas per annum. Twenty years later the annual output had risen to 325 million c.ft. To-day the output is 600 million c.ft. per annum.

In 1903 Central Offices and Showrooms were opened in Sussex Gardens, and Mr. James S. Garrard was appointed Secretary.

The Directors of this Undertaking have always pursued a progressive and enlightened policy and they are to be congratulated on having introduced in 1915 a co-partnership scheme. Practically every employee is now a shareholder in the Company.

Powers were obtained in 1909 to extend the supply of gas to Hailsham and district, and in 1930 showrooms were opened in Hailsham.

Further Development.

Mr. Sydney East Knowles was appointed Secretary in 1929 on the retirement of Mr. Garrard, and his advent into this most responsible position coincided with a bold policy of further development. In 1929 the adjoining property, No. 89, Terminus Road, was purchased, and a wonderful transformation took place in Sussex Gardens. Magnificent

THE NEWS—continued.

Showrooms were built after considerable expenditure and much structural alteration.

Not content with this great achievement in the provision of up-to-date amenities the Company proceeded to build and equip a new demonstration theatre, which has proved to be a great acquisition. It was opened in 1932, and it is here that cookery lectures and demonstrations are given by a lady expert.

The history of the Gas Company is, in fact, one long record of continual progress.

The Neunkirchen Disaster

"Das Gas- und Wasserfach," 1933, **76**, 133-135 (Feb. 25), reproduces the account given in the "Neunkirchener Zeitung" (see "JOURNAL," 1933, **291**, 461, Feb. 22) and adds the following comments:

The further information given by the surviving workman (referred to in the previous issue—see "JOURNAL," 1933, **201**, 462), who, previously, was still not quite able to be examined, to the effect that he struck with a hammer one of the supports of the main and that the explosion developed at the same moment, can only have a bearing on the explosion if a mixture of gas and air had been present *outside* this main and, particularly, if an explosive mixture of gas and air had been present at the spot where the hammer struck the support and possibly created a spark. Even though the main had contained a mixture of gas and air, the spark caused by the hammer could not have brought about ignition *in* the main unless the contents of the main had been in communication with the external air where the hammer blow occurred and this air had been heavily charged with gas. There is, however, no evidence in the above explanation that there was an ignitable mixture just where the man was working, since it would, undoubtedly, have revealed itself in the form of a very strong smell of gas. It is surprising that, so far as the report shows, the workman made no mention of this, and to this extent the above statement which depends on the narrative of the workman, must be held to be inconclusive if no further explanation follows. Never can a main, the contents of which —no matter their composition—are not in communication with the outer air, be ignited and caused to explode by the agency of a spark or the like occurring *outside* the main.

The latest information as we go to press is to the effect that the work of clearing up the débris has not been commenced and that it has not been possible to inspect the present condition of the main which has been referred to several times. The statements relative to the main are therefore suppositions which still require proof. Though it is, furthermore, stated that from the main rent by the explosion "very much gas streamed out—the opening was 25 in. in size," this statement of the dimension is, in itself, incomprehensible. It can only be taken that by this is meant that the burst main had been 26 in. in diameter. It must, further, be regarded as little likely that the powerful flame formed by the issuing gas and burning for five minutes was able to bring the plates of the holder to a red-heat. It is much more likely that an illusion on the part of the eye-witnesses is involved, and that they may have been deceived by the fact that the luminous flame was reflected on the holder just as any large flame gives an appearance of fire on buildings in its vicinity. The President of the Gasholder Committee of the German Association of Gas and Water Engineers, Chief Engineer Mecklenbeck, of the Berlin Urban Gas-Works Company, was unable, in his investigation, carried out on the spot, to find any plates which were covered with scale on the surface.

Full knowledge will only be obtained when sufficient progress has been made with the clearing up of the débris and the necessary investigation is made, and that, too, with the collaboration of an expert in gas technology actually experienced in the subject of mains and holder operation. It is to be hoped that the investigation will be commenced without delay and that it will be an exhaustive one.

THOUGHTS ON THE DISASTER.

Under the heading "That is not the Way," R. Nübling, Director of the Stuttgart Gas-Works, contributes the following to "Das Gas- und Wasserfach," 1933, **76**, 132 (Feb. 25).

The explosion of the holder at Neunkirchen has, as could not but be expected, given rise to great anxiety on the part of the population of most towns, and it is obviously the duty of all members of the Industry to allay these fears by every means. This is all the more necessary since, at Neunkirchen, an event of quite an exceptional kind is concerned.

It is misleading to the public and at variance with the facts for a number of specified gas engineers who, by chance, have, so far, no waterless holders on their works, to seek to calm the inhabitants of their districts with the argument that with a water-sealed holder such an accident could, in general, never have occurred. This view must emphatically be deprecated because, for many years, waterless holders have been employed in large numbers and of huge size in densely populated districts, and in no case have given cause for anxiety (*e.g.*, the Ruhr district and the 19 million c.ft. holder in the heart of Chicago). In the circumstances, even a water-sealed holder would have become involved in the present disaster. I regard it as necessary that it is precisely with such accidents as may occur in our Industry that there should be the greatest unanimity and that, through varied and contradictory statements of opinion, there should not be aroused in the populace fears and distrust which can but serve to hamper the development of gas consumption.

As far as the Neunkirchen holder is concerned, views will, in my opinion, perhaps have to be considerably modified. With other gas engineers, I tend more and more to the opinion that the first explosion in the holder took place not above but below the piston—*i.e.*, in the gas space. I shall amplify this view in fuller detail later on. Even now, it can be stated that it is borne out by the following considerations.

(1) All the lower shell plates were torn away. This would not have been the case with an explosion above the piston—at least the lower sections would have remained standing.

(2) The piston was completely demolished. However, it does not lie on the holder bottom, but, on the contrary, portions of the cups were scattered far and wide up to a distance of 500 ft. These portions are curved upwards—*i.e.*, towards the roof. Only the slide guides remain with adhering piston plates, and these, too, are bent upwards. From this, also, it must be concluded that, with an explosion above the piston, it would have been quite impossible for the portions of the piston to have been scattered so widely.

(3) It is established that the first and smaller explosion originated in a main situated outside the holder—namely, according to the report of the Industrial Supervisory Council, in the by-pass main, in the connecting piece, probably filled with a gas-air mixture, between the by-pass valve and the blank flange. As a result, the holder must have been damaged by flying fragments. The connecting piece between the outlet valve and the blank flange was, according to the constructors, burst open, and this, too, can be ascribed to an explosion below the piston.

(4) In accordance with the foregoing, it is to be assumed that the first and smaller explosion took place in a free main (the by-pass main) and the second and larger explosion under the piston. The question whether, on the whole, and to what extent this explosion under the piston provoked a similar secondary explosion above the piston remains open. It only remains to ascertain how this first explosion in the by-pass main caused the explosion under the piston. It is, actually, possible to find a conclusive explanation for this—*e.g.*, with the help of the fact that the compressor serving the steelworks continued to run after the first explosion, after the piston must, presumably, already have become jammed.

I give these views subject to further confirmation. I regard it as my duty to point out that opinions must be formed only with caution. One thing is well-established in my view—the large explosion occurred under the piston. This is the only explanation which fits in with the above facts.

British Industries Fair, Birmingham

Exhibition Buildings to be Enlarged

The Birmingham Section of the British Industries Fair, which extended over eleven days and closed on Friday night, proved very successful. In a report issued by the Board of Management it was pointed out that while many exhibitors did much business, the real influence of the Fair goes beyond the immediate benefits it affords to British home and foreign trade. It was of inestimable value as a means of business propaganda and for establishing relationships. The statement continued: "Some exhibitors reported that transactions were completed as a result of negotiations opened at previous Fairs. Demand for space for stands was so great that a number of late applications had to be refused at this year's Fair. Many applications from exhibitors have been received for space accommodation for 1934. Manufacturers are asked to make known their requirements as soon as possible. The Board of Management of the Fair will shortly give consideration to the question of the further enlargement of the building."

The total attendance for the eleven days was 111,213, which is about 30,000 less than in 1932. In 1932 the public charge for admission was one shilling; this year it was two shillings, and the difference in the figures is largely explained by the fact that on Saturday, Feb. 25 (public day), the attendance was only 18,124, as compared with 39,735.

Mr. C. E. Greener (Chairman of the Board of Management) stated in an interview with our representative that at the recent Fair every inch of available space was occupied, and already 60% of the area was "booked" by exhibitors for the 1934 Fair. There was every indication that an extension of both the indoor and the outdoor area would be required. Arrangements had been practically completed with the City of Birmingham Corporation for a long lease of the land, and plans had already been drawn which would permit expansion on an entirely adequate scale. The extensions would, of course, be dictated by actual demand from time to time.

At the close of the Fair an official statement was issued by the Management Board regarding the business experience in the various industrial groups. There is no doubt, however, that the number of overseas buyers was rather less than in 1932, and while the inquiries generally were regarded as most encouraging, actual buying was on a conservative basis. Many of the representatives from overseas bought liberally of sample lots, which the exhibitors regard as a very encouraging sign.

Gas Section.

The official report issued with regard to the Gas Section was as follows: "The leading makers of gas plant and equipment again had stands in the Fair, and the opinion was expressed, both by British gas engineers and experts from the Continent, that the display was the most complete even seen in this country. While interest was manifested in the products of all departments of the Industry, special attention was this year arrested by the work of the Industrial Research Laboratories, particularly in relation to the heat treatment of metals by gaseous fuel. It is apparent that gas is destined to play a more important part in industrial operations in this country.

"Demonstrations in the Fair suggested the far-reaching possibilities in the use of compressed coal gas as a motor fuel. The trade outlook in the Gas Industry is considered to be extremely satisfactory."

Leading exhibitors of gas-works equipment informed our representative in Birmingham that the number of trade inquiries was "extremely good." Many makers of gas fires and cookers expressed themselves quite satisfied—though they made it quite clear that they regarded the value of the Fair more from the angle of propaganda than from actual sales.

London Section of the B.I.F.

Two attractive displays of gas products were staged at the Olympia Section of the British Industries Fair on adjoining stands by the Gas Light and Coke Company and the South Metropolitan Gas Company—both of them showing in a striking manner the very wide range of useful chemicals for a vast number of different applications which present-day gas-works practice enables to be distilled from coal.

The Gas Light and Coke Company's stand was a bright and well set out display, typical examples of their chemical products being arranged in an attractive manner on glass shelves in four alcoves. Above each alcove, casting a brilliant illumination down on to the exhibits, were two 12-mantle strip directive gas lanterns, making a total of ninety-six mantles in all. Old-fashioned type gas standard lanterns at the corners of the stand contributed a pleasing effect to the display.

The chemicals exhibited are produced under modern conditions at the Gas Light and Coke Company's Works at Beckton and Southall. Special attention is paid to the production and delivery of a very high grade of distilled tar for the surface-dressing of roads, the manufacture of tarmacadam, &c. This is supplied in drums, barrels, and rail-tanks, while a large fleet of road tanks, fitted with every appliance for delivering tar hot, either to contractors' plants or for spraying direct on to the roads, is maintained by the Company. The amount of tar produced by the Gas Light and Coke Company per annum is in the region of 29 million gallons, while the sulphate of ammonia made totals some 20,000 tons.

An interesting illustrated brochure available on the stand listed the tar, ammonia, and inorganic products manufactured by the Company, giving specifications of each, together with details as to their chief applications.

The stand of the South Metropolitan Gas Company was designed by a member of the Company's staff, Mr. A. E. Dobson, and took a very attractive form. The outside walls were aluminium painted, the lower panels being in relief, with numerous shelves set back in the walls to hold the many examples of the Company's tar and chemical products. At either end were windows, behind which were glass shelves holding further samples of products, while in front of and below these were scenes, in relief, in the one case, of a gas-works depicted on a riverside site, and, in the other, of a country house and garden in attractive colours to emphasize the uses of sulphate of ammonia as a fertilizer. Around the stand were bracket gas lamps in handsome panel fittings and aluminium finish.

The inside of the stand took the form of a comfortable information bureau, warmed by an attractive "Metro-Log" gas fire, opposite the door and visible from outside, the gas supply being controlled by a cock fitted flush in the wall at hand level. On either side of the fireplace were gas lighters and ashtrays on brackets for smokers, while the lighting of the interior was effectively carried out by distance-controlled glass-panelled ceiling fittings.

A product which has only recently been placed on the market by the South Metropolitan Company, and which was exhibited on the stand, is their "Metrotect" paint for outdoor ironwork. It contains no linseed oil and therefore cannot absorb water, being as a result totally unaffected by prolonged immersion. It is equally resistant to acid fumes or any other form of acid attack. "Metrotect" is made from coal tar products scientifically blended to give a glossy black film of remarkable elasticity, which renders it impervious to vibration or slight movements of the structures that it protects. It is, therefore, particularly suitable for application in industrial situations.

Various grades of gas coke were also shown on the Company's stand, including "Metro-Coalite" low-temperature fuel. A fairly new grade of coke put on the market by the Company is "Solarite," which has been produced to meet the requirements of customers who, for various reasons, experience difficulty in controlling or maintaining a fire throughout the night in small domestic boilers. This coke responds readily to damper regulation, burning up rapidly when the dampers are opened and a hot fire is required to heat large quantities of water quickly; or, when the dampers are closed, it will burn slowly for long periods without attention. "Solarite" is stated to have a very low ash content, and its use reduces clinker troubles to a minimum.

"Metro" wood preservative was another interesting product shown on this stand, the oils used in its preparation being selected from those fractions of creosote known to have the greatest antiseptic and toxic properties.

The South Metropolitan Gas Company have two chemical works dealing with bye-products from 12 million gallons of tar, and 50 million gallons of ammoniacal liquor annually, and a booklet available on their stand gave details and specifications of their products.

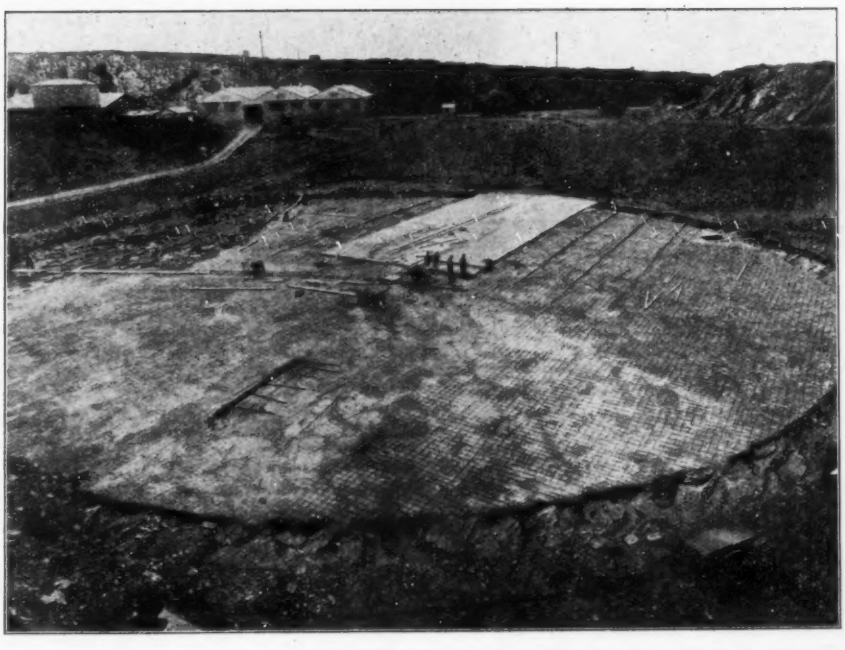
NEW HOLDER IN THE - WEST OF ENGLAND -

Plymouth and Stonehouse Gas Light and Coke Company Increase their Storage Capacity

A new four-lift 5-million c.ft. gasholder for the Plymouth and Stonehouse Gas Light and Coke Company at the Works at Cattedown was brought into use for the first time on Wednesday, Feb. 22, after an inaugural ceremony. The present storage capacity of the works, provided by three holders, is little more than 3½ million c.ft. The newest and largest of the holders in use prior to Wednesday's ceremony has a capacity of approximately 2 million c.ft. and was built thirty-six years ago when the annual output was about 670 million c.ft., or approximately one-third of the quantity now provided. The maximum recorded output of the Company is over 8½ million c.ft. per day, and nearly 1 million c.ft. per hour during the cooking period.

To cope with the ever-increasing demand it was decided in 1930 to install an additional holder of the spiral-guided type, with a capacity of 5 million c.ft., bringing the total storage capacity up to about 8 million c.ft., approximately equal to twenty-four hours' maximum demand. The work was undertaken by Messrs. Broadhead Constructions, Ltd., of Structure House, Manchester, who sublet the fabrication of their main material to Messrs. Mechans, Ltd., of Glasgow.

Site, Commencement of Clearing Operations.



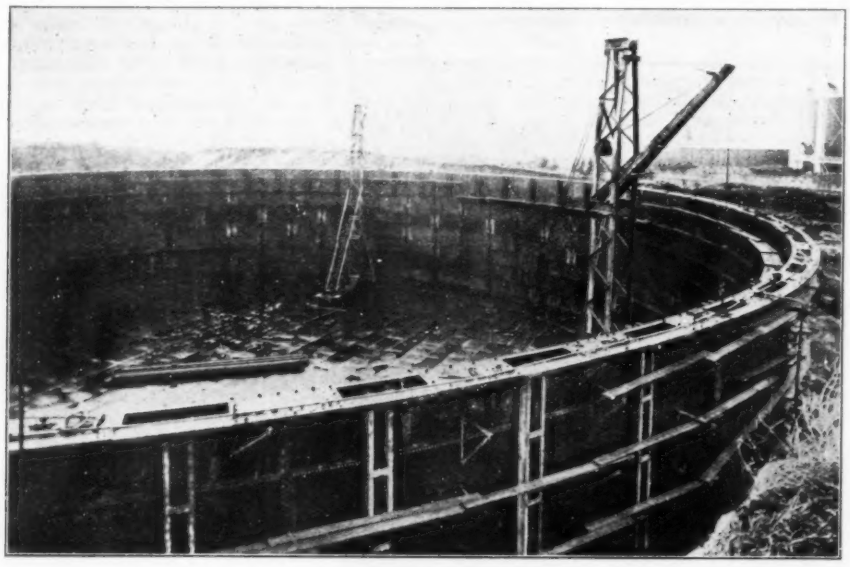
Site Cleared and Levelled. Foundations Commenced.

As it was impossible to accommodate this new holder on the existing works a Board of Trade Order was obtained to schedule an adjacent site near Deadman's Bay. This was a limestone quarry, the solid floor of which provided an excellent bed for the necessary foundations. To accommodate these, some 17,275 cubic yards, or 21,500 tons, of quarry spoils had to be removed, and were used to extend a high level portion of the adjoining property, while

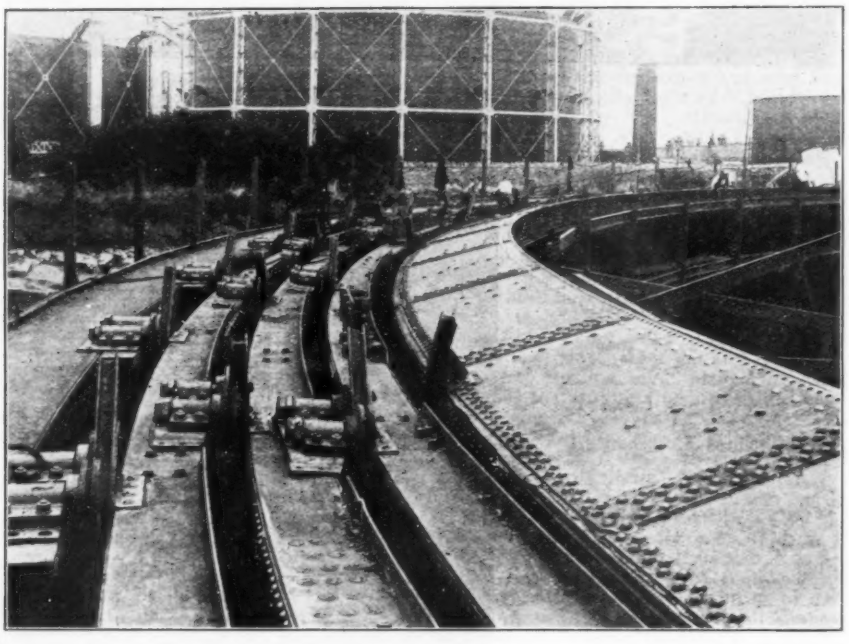
new approach roads were also formed. The work was carried out, under the direction of the Company's technical and engineering experts, by Messrs. J. W. Scott & Sons, of Bampton, Devon.

The order was placed in November, 1930, and workmen commenced clearing the site just over two years ago. The foundations were started in May, 1931, and finished within two months. The erection began in June, 1931, and was finished fifteen months later, in September last, and since then exhaustive tests have been carried out. The holder is a very substantial construction throughout. The steel tank has a diameter of 212 ft. and is 40 ft. 9 in. deep. All gauge sheets and the bottom row of side plates and cup skirting plates of each lift are in "Armco" iron. The inlet and outlet pipes have a diameter of 3 ft. All the materials used in the construction of the holder are of best-quality British manufacture. There are approximately 1075 tons of metal in the holder, 1084 tons in the tank, and 240 tons in the crown framing.

There are three anti-freezing injectors to each hydraulic cup and three to the tank, which are connected to a self-contained Paxman gas-fired boiler.



Steel Tank and Balcony.



Four Lifts Complete with Outer Row of Crown Plates, Showing Stiffening Curb.

Inaugural Ceremony.

There was a large gathering of shareholders, officials, and employees of the Company to witness the turning-on of the gas to the new holder by Mr. J. H. Ellis, now Deputy-Chairman, and Chairman and Managing Director of the Company when the contract for the holder was placed.

Mr. R. W. Broadhead, Managing Director of Broadhead Constructions, Ltd., formally handed the holder over to the Company, and it was accepted on behalf of the Company by the Chairman, Lieut.-Col. R. L. Norrington.

Col. Norrington said that one feature he wished to emphasize was that the holder was built throughout of British material by British labour, and that it had given a considerable amount of employment at a time when work was sorely needed. The Company had never failed their consumers, and this holder would enable them to say that with greater confidence than ever and would ensure to the public of Plymouth a ready and unfailing source of gas for cooking, heating, and lighting at a mere fraction of the cost of electricity. Col. Norrington declared that the holder was a symbol of the progress of gas. The Company acknowledged with appreciation the excellent work which their Engineer, Mr. R. J. H. Clark, and his assistant, Mr. A. E. Bullen, and their staff had done.

One behalf of the contractors, Mr. Broadhead presented Col. Norrington and Mr. Ellis with inscribed silver salvers as mementoes of the occasion.

Mr. Ellis said the holder had been greatly needed, and they could now say they were ready for any emergency and for that trend of business from the North to the South which some Scotsmen feared would take place. Mr. Ellis added that thirty years ago he had something to do with providing Plymouth with an adequate water supply, and now he had lived to see it supplied in abundance with both water and gas. They

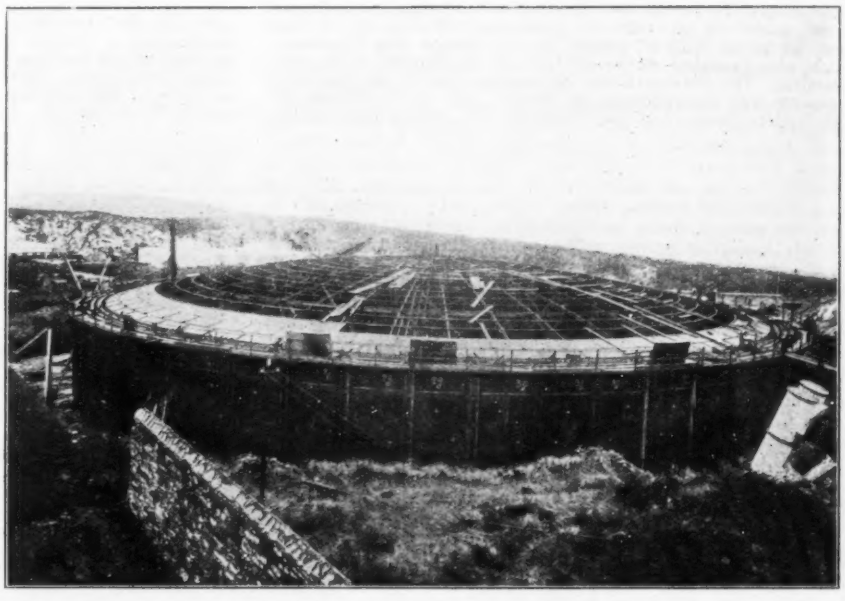
Property of
Seattle Public Library

were not afraid of electricity, or any commodity which might come into opposition with gas. With their employees working on a co-operative basis they felt sure they could meet any competition with absolute success.

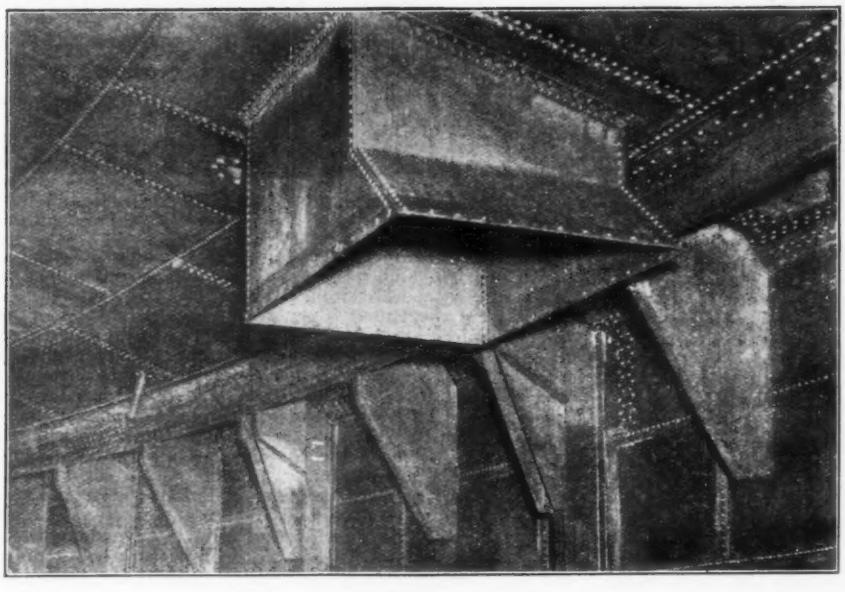
Those present then made an inspection of the new holder, and subsequently were entertained at luncheon by the Directors, the guests including representatives of various gas undertakings in the West of England.

Proposing the toast of "The Contractors," and coupling with it the name of Messrs. Mechans, Ltd., who, he said, actually produced the material with which the holder was constructed, with ultra modern electric lights of many times greater power which had recently been installed in some streets. He regretted very much that the authorities had so far not seen fit to make a fair and unbiased comparison between modern gas and modern electric lighting in the streets of Plymouth. The Gas Company had certainly nothing to fear from such comparison.

Mr. BROADHEAD acknowledged the toast on behalf of his firm. He said there was no need for him to emphasize what gas had done in clearing the atmosphere of towns by reducing the smoke nuisance. He believed the movement which would bring back prosperity to this country quicker than anything else was "back to coal," and the only rational way of using coal was by carbonization. Such a movement offered a unique opportunity to the Gas Industry, and they had in their hands to-day the means of doing more good for this country than all the world economic conferences put together. The Plymouth Gas



Crown Framing Complete in Tank.



Interior of Inner Lift Showing Stiffening Curb, Brackets, Livesey Manhole Hood, etc.

Col. NORRINGTON observed that the firm's relationship with the Directors had been most cordial throughout the work. The Gas Company had available for the citizens of Plymouth a cheap and unfailing supply of heat and light, the result of treating their home-produced raw material—coal—in the most efficient and economical manner. Gas had played the principal part in purging the atmosphere of Plymouth from smoke and soot. It had transformed a vast number of old-fashioned fireplaces and kitchen ranges from sources of grime, dirt, and never-ending labour into clean, efficient, and labour-saving appliances. Should any of the Company's guests that day be in Plymouth at night he begged of them to remember that the gas lighting of the streets was not under the Company's control. The gas lighting had never been modernized. It was obviously unfair to compare the antiquated methods of gas lighting employed—usually a single burner passing 2½ c.ft. of gas per hour—Company was well known throughout the country, and he paid a tribute to the sterling worth of its former Engineer, Mr. P. S. Hoyte; the present Engineer, Mr. Clark; Mr. Ellis, the former Chairman; and Col. Norrington, under whose control and guidance the long line of prosperity was being continued.

The toast was also acknowledged by Mr. J. Y. MOYES, on behalf of Messrs. Mechans, Ltd.

Replying to the toast of "Success to the Plymouth and Stonehouse Gas Light and Coke Company," Mr. CLARK said the output of the works was 8½ million c.ft. in twenty-four hours. Without this new holder they had a total storage capacity of 8½ million c.ft., so it could be imagined what relief they now felt that they were able to bring the total storage capacity up to the equivalent of a day's output.

Mr. HOYTE, who is now a Director of the Plymouth Company, in proposing "The Visitors," said that the relationship between

the Company and other gas undertakings had always been very cordial, and he was sure they would go forward to greater prosperity.

Mr. J. E. DAW, in responding, said that when he became a Director of the Exeter Company his first thought was to take a step which the Plymouth Gas Company had taken in seeing that all their employees should benefit from what they were doing. He started co-partnership and a pension fund for the benefit of all the people employed by the Company.

Mr. F. BLACKBURN, Gas Engineer to the Plymouth City Council, said he thought the inauguration of the new holder told the Gas Industry that it was going forward. He was very sorry that the street lighting in the Plymouth area was not what it should be, but if any of the visitors came out to Devonport that night he would show them what street lighting by gas really was. It was interesting to note the growth of the Plymouth Gas Company during the past eighty-eight years. Prior to 1846 Plymouth and Stonehouse were supplied with gas at the rate of 9s. per 1000 c.ft. (compared with 2s. 3d. to-day) from works at Millbay owned by the United Gas Company, which also operated works in Ireland, at Dublin, Cork, and Limerick. The Plymouth and Stonehouse Gas Light and Coke Company was incorporated by Special Act of Parliament in 1845, and in January of the following year started making gas on the site of the present works at Coxside, charging at the rate of 6s. per 1000 c.ft. In September, 1848, the works of the United Gas Company were purchased and closed down. The area of supply was extended to Crownhill in 1904, and six years later to the Plymstock district by the high-pressure system. In 1921 the Undertaking of the Plympton Gas Company was acquired, the plant there being closed down as soon as a high-pressure extension from the works at Coxside had been completed. Since that date the gas sold at Plympton had increased from 10 million to 50 million c.ft. per annum. Further powers were obtained in 1930, when the villages of Roborough, Brixton, and Yealmpton were given supplies. As a result of these important extensions, together with a considerable increase in the use of the supply in the city itself, the total gas sent out under high-pressure last year was 120 million c.ft. To-day, 1858 million c.ft. was sold to consumers in the Plymouth area annually. Since the formation of the Company in 1845 the capital expenditure had amounted to an average computed at £361 per million c.ft. sold, and the total capital expenditure was estimated at £671,697. Altogether the Company supplied 45,785 factories, business premises, domestic users, and other consumers. There were 145 miles of mains (including 20 miles of high-pressure mains), so that there were 316 consumers for every mile of main.

"CURLING" BY GAS LIGHT

A new system of gas lighting the pond used by the Craigie Hill Curling Club in Perth has been completed by the Gas Department of the Perth Corporation. A description of the installation was published in the February Bulletin of the B.C.G.A., and is reprinted here. We are also indebted to the Association for the accompanying illustration of a curling match in progress.

The pond is situated in a disused quarry and is levelled with asphalt. The quarry hole is from 30-40 ft. high at the south end, open at the north end, while the height of the east and west walls varies from 30 ft. to 6 ft., but averages about 20 ft. The quarry face is severely weathered, making the rock surface very crumbly.

For the benefit of Southerners, it may be necessary to explain that the ancient Scottish game of curling is not unlike bowls. Stones are "curled" up the ice from one tee head to the other. No bias is required in the stone, the curler causing the stone to revolve as he casts it. As the stone travels fast it takes more or less a straight line, but as it slows down the revolving action causes it to curl in the required direction just as a biased bowl would do.

A Match in Progress on the Craigie Hill Pond.

The play is exactly like bowls, each player having two stones and playing alternately with his opponent. Skips direct the players, and the side having stones lying best count these shots at each end as in bowls. Brooms are used to sweep the ice clean in the path of the stone if it is not likely to travel the required distance. The skips direct the sweeping. The shouting of directions makes the game of great interest to the spectator, and rank goes by the board. Often the laird is happy to get a place in his gamekeeper's rink and to take orders and chaff which would gain the keeper instant dismissal in other circumstances.

The lighting system for the game offered special difficulties, for even illumination was needed and the trajectory of the stone must be easily followed. Absolute freedom from glare is essential.

Originally the pond was lit by eight 2-light Graetzin lamps, one at each tee and suspended over the hog's score line at a mounting height to the mantles of 8 ft.

The lighting was improved this year by substituting four 12-light strip lanterns mounted two at each end at a height of 12 ft. to the mantles. No. 2 mantles were used, and the lanterns had each two plane stainless steel reflectors set at the required angles. It was not possible to alter the position of suspension because of the physical formation and condition of the quarry walls and also because any other position was likely to cause glare.

Holes were jumped at an angle in the quarry face to a depth of 2 ft., and special eye bat bolts, grouted in ⅜ in. drain wire rope, were slung across to carry the piping. The lamps were suspended from cross pieces, the upper leg of the cross piece having a hook bolt screwed in a pipe thread to give direct suspension to the lamp. To prevent the lamp blowing about too much the original wire suspension was retained below the lamp and the lamp wired to the lower rope. The sag in the wire rope has increased since erection, but in case damage is done to the installation no attempt will be made to take this up until the lamps are removed for the summer months.

The lamps are Messrs. Foster & Pullen's standard strip lights in a suitable stainless steel reflector on each side. During a storm on Jan. 1, the only damage done was a broken glass caused by one of the reflectors being pulled out of adjustment and being blown against the glass. No mantles were broken, although the by-pass was, of course, blown out and curiously enough that of the lamp diagonally opposite.

The Perth Gas Department carried out the complete installation and obtained the business on a hire purchase and maintenance basis. The purchase price extends over three years and the maintenance charges are included. After the three years the maintenance charge only will be payable.

A TECHNICAL SIGNPOST : TO THE "JOURNAL" :

Vol. 200, October-December, 1932

A striking commentary upon the absence of co-ordinated research in the coal industry is found in the last Presidential Address to the Institute of Fuel (p. 271). While many of the industries of this country maintain research associations—irrespective of those of individual firms—the coal industry cannot show any such research organizations apart from the Lancashire and Cheshire Coal Research Association and the British Colliery Owners' Research Association, which latter is described as " a kind of technical information bureau without even a laboratory."

Independent and reliable information regarding the degree of accuracy and reliability of the various types of calorimeters is of the greatest practical value, and the recent report (p. 15, Supp., Oct. 26) of the Institution Research Committee on the Sigma B.Th.U. Recorder is thus of considerable interest. The Sigma instrument possesses only a moderate degree of accuracy (± 2%), and it is thus most suitable for indicating the changes in calorific value of the gas from the retort houses, &c., or for recording, on small works, the variations in the calorific value of the gas between the periodical visits of the gas examiner. Doubt is, however, expressed as to whether the accuracy is such as to justify penal action being taken against any undertaking. Where the instrument is frequently checked, the accuracy may be increased to ± 1% so long as there are no marked fluctuations in the composition of the gas. The errors arising from various sources such as gas governing, automatic temperature and pressure corrections, &c., are set out in the report, and it is noted that, where the calorific value is fluctuating, the average value would appear to be correct, although the full amplitude of the variations may be inaccurate.

The possibilities of the generation of combustible gases by anaerobic fermentation and the difficulty of distinguishing between these gases and coal gas became a subject of importance in the discussions which took place subsequent to the Holborn explosion in 1928. The information given in the recent paper (p. 9, Supp., Oct. 26) by Prof. Haldane on the nature of the gases which are encountered underground is thus of particular interest to the Gas Industry. Reviewing the evidence which was presented at the inquiry on the above explosion, he considers that the data upon which the explosion was attributed to coal gas leakage were insufficient to justify this conclusion, and that the possibilities of the presence of large quantities of fermentation gas were, perhaps, not sufficiently appreciated. A fall in barometric pressure may result in the liberation of a very large volume of gas from the soil, an instance being quoted where a fall of 0·4 in. pressure resulted in 12 million c.ft. of gas being liberated into a well in Northallerton. Analyses of gas collected from underneath a pavement were given by Hollings, and these showed that the gas consisted mainly of methane and nitrogen, due probably to anaerobic fermentation. On the other hand, earth taken from the Holborn area and fermented in the laboratory gave a gas containing 45·1% hydrogen, 48·7% nitrogen, with only a trace of methane, which is generally regarded as a normal fermentation product. The presence of carbon monoxide is not regarded as a positive proof of the existence of coal gas, since this gas can be produced under a variety of conditions. Another source of gas accumulation is the existence of short circuits in electric cables, many of which were at one time laid in troughs filled with bitumen.

General interest in the use of compressed gas as a motor fuel has been stimulated by the recent advance in petrol prices. In Paris, where the practice was first introduced, a new compressing station has been opened (p. 146), which contains several compressors, the largest handling 7000 c.ft. of free gas per hour up to a pressure of 250 atmospheres. Special care is taken to prevent any liquid condensate from the gas entering the storage cylinders, which altogether have a capacity of 20,000 c.ft. of free gas. From these cylinders five lorries may be simultaneously charged with compressed gas. During the compression of the gas the calorific value falls from 480 to 439 B.Th.U. per c.ft. owing to the condensation of the higher hydrocarbons, and 85-95 gallons of crude benzole are collected per million c.ft. De-benzolization and compression are thus conveniently performed in the one operation. At Birmingham, subsequent to extensive laboratory trials, tests have been made using compressed gas on a 20 h.p. Austin lorry (p. 556). The gas storage is composed of five cylinders, each holding 350 c.ft. of gas, which is compressed to 3000 lbs. per sq. in., the resulting increase in weight of the lorry being 4¼ cwt. Excellent running results are being obtained, and it is stated that one therm of gas of 475 B.Th.U. per c.ft. is approximately equal to one gallon of petrol. A further advantage is claimed in the fact that the exhaust gases are free from carbon monoxide.

The somewhat extensive publicity which was given by the Press to the experiments made by the Cunard Company on the use of coal-oil mixtures has apparently resulted in a belief in some quarters that the use of this fuel would provide a ready means of increasing the output of coal in this country. In a paper on this subject (p. 219), Brame points out the practical difficulties which oppose the extensive use of a coal-oil fuel. For marine purposes, its use is limited to steam-propelled vessels, and as its stability at certain temperatures is rather an uncertain factor this complicates storage in foreign ports, &c. If the cost of coal grinding is not excessive, some advantage in cost should be possible as compared with oil, but no further information on this subject was advanced. The potentialities of mixtures of coal and tar oils as boiler fuel were discussed, but no details of actual working with such fuels were available. Recently, however, experiments have been reported (p. 403) from Germany in which a mixture of 45% tar oil and 55% powdered coal was burnt in boilers using steam expansion burners. An evaporation of 5·5 lbs. per sq. ft. of heating surface was obtained with a thermal efficiency of 81%. It is hoped that a thorough investigation of this aspect of the problem will be made in this country.

Carbonization.

Now that intermittent vertical chambers have been installed at a number of works the tests (p. 16, Supp., Oct. 26) carried out by the Gas Investigation Committee on the Croydon installation are of value in affording the necessary data from which a detailed comparison may be made with other types of plant. Particulars of the Croydon installation, together with the general results, have already been given by Grogono in a paper before the Southern Association. It should be noted that rather higher makes are obtained in the Committee's tests, which are attributed to the higher flue temperatures which are now being maintained. Thus, from Durham coals, an average gaseous yield of 78·6 therms is obtained together with 13·35 gallons of tar. The gaseous yield is composed of 72·3 therms of coal gas and 6·3 therms of water gas, the latter being obtained by steaming the charge during the last two hours of the carbonizing period. The average quantity of steam used is given as 3·27% of the coal. The settings are equipped with both recuperators and waste-heat boilers, and thus a fuel consumption of about 13% (dry coke) is obtained. On the other hand, the waste-heat steam generated amounts to only 465 lbs. per ton of coal. From the heat balance of the producer and waste-heat boilers it is seen that 22·9% of the heat supplied to the producer is lost in the waste gases, while the heat utilized in the retort, together with that lost by radiation and convection, amounts to 53·7%. The latter value equals 20·45 therms per ton, of which about 9·5 therms are present in the hot coke discharged.

Attention is drawn to the fact that the coke charged to the producer is saturated with water, the average moisture content being 34·3%. The extra fuel consumption necessary to evaporate this water, the latent heat of which is not, of course, recoverable, is equivalent to 1·13 therms. Thus, using dry coke the fuel consumption would be reduced to 12·66%. In regard to the steam supplied to the chambers an average of 72·5% is decomposed, but this percentage varies considerably according to the completeness of the carbonization before steam is admitted and the extent to which the charge shrinks in the chamber. The values given for steam decomposed vary from 53·1% to 91·4%.

Considerable pains were taken to determine the loss of gas by leakage. The methods adopted are based on those described by Hollings, and involve, *inter alia*, the use of the waste-heat boiler as a meter for the volume of waste gas. Calculations, the details of which are clearly set out,

show that the carbon loss from the chambers is equal to 6·3 lbs. and the hydrogen loss to 1·98 lbs. per ton of coal. It is shown that the leakage of water gas is negligible, and the above loss may be assumed to be wholly in the form of coal gas; hence its thermal value is equal to 1·6 therms per ton of coal. Computation of leakage in this way is open to many errors and requires extremely accurate measurements, and the summary, which is included, shows the extent to which the calculated leakage values may be influenced by errors in some of the various measurements; the summation of these errors may be sufficient to vitiate seriously the results obtained.

In a paper (p. 805) dealing with carbonization control at Dundee there are two points of special interest. The volume of crude gas from the retorts of each bench (three in all) is measured by Arkon recorders, which actually determine the differential pressure over an orifice in the gas main. The information obtained in this way is always of considerable value, and it should indicate the means of securing increased thermal yields on many works. In order to reduce the deposition of dust, which arises during clinkering, hoods are fitted over the producer doors, and through these a good current of air is aspirated by a fan. While producer clinkering is not the only source of dust in the retort house, the scheme adopted is a step in the right direction and has apparently been successful in improving the existing conditions.

A criticism has been recently made (p. 320) of the results published by Terres in regard to the heat required to carbonize different types of coal. It is suggested that large experimental errors may be incurred in the methods adopted by Terres and that the results are consequently unreliable.

A further communication (p. 320) has appeared regarding the generation of water gas in coke ovens, a process which, owing to the poor coke markets, is finding favour in Germany. In the Collin process, which has been applied to a battery of 40 ovens, the steam is passed through two ovens in series. Entering at the top of one oven the steam passes diagonally through the coke to the opposite end, whence it passes to the adjacent oven, the flow here being in the reverse direction. Suitable arrangements allow the direction of flow to be reversed as required. It is claimed that 90% of the steam is decomposed after passing through the two ovens, and that a good quality water gas is produced, a typical analysis being CO_2 4·1%, O_2 0·4%, CO 36·5%, H_2 51·6%, CH_4 1·8%, N_2 5·6%.

Refractory Materials.

Further results have been published (p. 21, Supp., Oct. 26) by the Refractory Materials Sub-Committee of the Institution on the following subjects:

1. Permeability of refractory materials.
2. Action of carbon monoxide on refractory materials.
3. The hot patching of gas retorts.

In regard to the first problem, although the experiments have been extended to include the permeability to nitrogen up to 850° C., the experimental conditions are still rather removed from those of actual practice. The permeability is found to decrease with increasing temperature approximately in proportion to the increased viscosity of the gas, and, assuming this to hold at higher temperatures, it is calculated that in works practice a loss of 0·75% of the gas would occur from new vertical retorts. The retort material would, on use, become glazed by slag and the pores to some extent filled, and consequently the above value may be regarded as a maximum. Reference is made to the carrying of dust into the material by the gases, and to the harmful results thereby incurred. A point of interest is the low permeability of diatomite insulating materials.

Further experimental work has confirmed the fact that the "iron spots" occurring in refractory materials should be regarded as sources of disintegration of the material when the iron is present as free "iron oxide." If present as a silicate or in any other form there is little danger of disintegration arising from these points. The tendency to disintegrate is, in general, lessened by increasing the duration and temperature at which the materials are initially fired.

A considerable amount of large-scale work has been carried out on the various methods which have been proposed for hot patching. In regard to patching with a paddle it is concluded that: (1) The outstanding difficulty of making wet cement adhere to the brickwork has not been solved, although a small amount of cellulose liquor was found to be benefificial. (2) Addition of fluxing material is unsatisfactory owing to the reduced refractoriness of the product. Experiments were also made using various mechanical means for introducing the patching materials, such as injection by compressed air, with a cement gun, or in a blowpipe flame. In regard to the application of the cement with a gun, a satisfactory adhesion was obtained, but the method has the inherent disability that the area covered in each operation is very limited. Quite good deposits were obtained using a dry cement mixture, which was applied by a stream of compressed air, but difficulty was incurred in placing the cement in the required position.

Purification.

The difficulty experienced in many works in removing the final traces of hydrogen sulphide from the gas, and the sometimes unaccountable presence of this impurity in gas which, to all intents and purposes, has been completely purified, are commented upon in a recent German article (p. 320), in which are summarized the reactions which may lead to the formation of hydrogen sulphide in a "clean gas." This impurity may arise from the organic sulphur compounds in the gas by a variety of reactions—with ammonia, with oxides containing excess of alkalis (caution is given against putting new Lux into a final box), and by contact with organic bases present in the wash-oil during benzole washing. This last reaction is most serious when using tar oils, but negligible when using gas oils. All these potential sources of hydrogen sulphide emphasize the desirability of removing the organic sulphur compounds, although this is very rarely carried out. During the process of benzole extraction by active carbon these compounds are reduced to 6-8 grains per 100 c.ft., and, further, it is well known that the sulphur compounds can be reduced to hydrogen sulphide by passing the gas over a catalyst. This latter reaction forms the basis of the Carpenter-Evans process, in which precipitated nickel is used as the catalyst; but this process is only used by one undertaking. According to recent German investigations the sulphides of uranium and molybdenum constitute suitable catalysts for this reaction. At 420° C. complete decomposition of carbon bisulphide in steam is obtained with uranium, while the total sulphur compounds in a sample of coal gas are reduced from 32-40 to 4 grains per 100 c.ft. The cost of such catalytic material is, however, very high and would most probably prove prohibitive for the treatment of town gas.

A small plant for the dehydration of gas by refrigeration by the Aumont process has been erected at Touques, in France (p. 499). Water is cooled to 32° F. by ethyl chloride and used to cool the gas from which the naphthalene has been previously scrubbed. The gas is cooled to 39° F. and subsequently compressed to 4½ lbs. per sq. in. for distribution. The cooling water is ingeniously circulated through the gas cooling tower by a gas lift actuated by the compressed gas. The power consumption is given as 1·7 kilowatt hours per 1000 c.ft. of gas treated. Operating costs would be of considerable interest for comparison with the processes of dehydration in favour in this country.

The difficulties arising from the deposition of gum from coal gas upon valves and fittings are becoming increasingly important in this country with the growing practice of benzole extraction, and the question of removing the gum-forming constituents by oil washing has already received considerable attention. The problem is of longer standing in America, where a greater proportion of water gas is distributed, and the results of over twelve years of investigation work on this subject have been given in a recent paper by Fulweiler (p. 570). The gum deposits may be divided into two classes, (*a*) "liquid-phase" gums from the polymerization of condensible hydrocarbons, and (*b*) "vapour-phase" gums which are present in the gas as ultra-microscopic particles. The former type is an oxidation product of mainly styrene and indene, whereas the latter type contains over 5% of nitrogen, and explodes violently on heating, yielding oxides of carbon and nitrogen. This latter deposit is apparently formed by the interaction of the oxides of nitrogen and hydrocarbons in the gas. Each type of deposit has been carefully studied and suitable methods of removal have been devised. The formation of the "liquid-phase" gum is largely influenced by the concentration of oxygen in the gas and is accelerated by the presence of small quantities of sulphur compounds.

The best method of treatment is, apparently, to remove the indene, &c., by washing with a suitable solvent, and it is found that 1·5-3 gallons of gas oil are required per 1000 c.ft. of gas. Alternatively, the removal of the sulphur compounds and of the oxygen will produce the same result. A process is under investigation whereby the mercaptans, &c., are removed together with part of the hydrocarbons—a compromise which might yield the most economic results. Difficulties with "vapour-phase" gums are of more recent date and have necessitated a detailed investigation of the quantity and nature of the oxides of nitrogen present in the various gases. The results obtained are very interesting and show large variations in the quantity of these compounds present. Thus, in unpurified gas, the quantity of nitric oxide varied from 2·8

to 565 grains per million c.ft., while, in purified gas, the results vary from 0·9 to 168 grains per million c.ft. For the removal of the oxides of nitrogen, a process has been worked out, but this is not sufficiently advanced to allow publication of details.

Tar.

The interest which is being taken in the problem of the hydrogenation of coal has naturally spread to the parallel problems of the cracking and hydrogenation of high and low temperature tars for the production of motor spirit. The cracking of low-temperature tar in the absence of an atmosphere of hydrogen gives a relatively small yield of motor spirit, tests carried out in a Dubbs plant at Langerbrugge giving a yield of 28% acid-free motor spirit from the tar fraction boiling below 220° C., which is equivalent to 4·5 gallons per ton of coal. The hydrogenation of low-temperature tars has been successfully carried out on a large scale at Leuna, in Saxony, for a number of years, and is, technically, much simpler than the direct hydrogenation of coal. A considerable amount of experimental work has also been done in this country, largely at the Fuel Research Station, and some account of this is given in a recent paper by King (p. 213).

In the original experiments the process was an intermittent one, but recently a continuously working apparatus has been designed. The general method of treatment is to hydrogenate the tar in contact with a catalyst, the most satisfactory results being obtained with a mixture of sulphur and ammonium molybdate. A temperature of 400°-450° C. is maintained and a pressure of 100 atmospheres or more. Under these conditions, 20 gallons of low-temperature tar, representing one ton of coal, yielded 20·2 gallons of oil containing 11·6 gallons of motor spirit and 8·6 gallons of Diesel oil. In the case of high-temperature tars varying quantities of oil were obtained according to the origin of the tar. Thus a filtered horizontal tar gave 62·2% by weight of oils boiling below 360° C., and 16·4% of neutral oils boiling below 170° C.; with a vertical tar, this latter fraction equalled 13·4%. Difficulty arose from the clogging of the catalyst with free carbon, &c., and appreciably higher yields were obtained by pre-filtering the tar. The results show that the yields from the high-temperature tar are poor, and it is very doubtful whether they would justify the treatment involved.

With regard to the problem of using tar oils, notably the creosote fraction, for internal combustion engines—either of the spark ignition or compression (Diesel) type—the outstanding difficulty lies in the high ignition temperature of these fractions. In the above paper it is stated that so far as the essential requirements of such fuels are concerned there is no difficulty in producing them from the creosote fractions of tar. An improvement in combustion characteristics may be secured by the addition of "pro-knock" dopes such as ethyl nitrate, but at their present price the use of such materials would not be economical. The view is, however, expressed that the marketing of these dopes at lower prices is not unlikely in the future. The development of the Diesel engine in place of the petrol engine for automobiles is proceeding rapidly, and, if successful, should improve the market value of creosote as a motor fuel. On the other hand, it is considered in some quarters that the use of creosote as a motor fuel is more likely to develop if it is applied to engines of the spark ignition type, where the disadvantage of its high ignition temperature is not so serious. Support for this opinion is given by the successful use of creosote fractions in place of petrol on omnibuses in Belfast, and it is understood that large-scale experiments along similar lines are being made by the London General Omnibus Company (p. 403). The difficulty of the higher ignition temperature of creosote may be overcome in the case of the Diesel engine by the insertion of certain catalysts at the inlet of the oil jet to the engine. According to reports (p. 490) of research work carried out in Germany, the use of oxides of cerium, &c., supported on asbestos in the above manner results in a reduction in the ignition temperature from 440°-470° C. to 160°-180° C. Similar results were obtained with oxides of vanadium and cerium.

Interesting information concerning the modification of high-temperature tar by various methods of treatment has been published from the research department of Matthias Stinnes (p. 490). Oxidation of certain tar fractions was carried out in the presence of a catalyst such as vanadium pentoxide at a temperature of 440° C. The carboxylic acids produced were reduced to benzene, &c., by autoclaving with traces of caustic soda at 420° C. The process is said to work most satisfactorily with the fraction 200°-260° C., lower yields being obtained from the higher boiling fractions. An increase in the yield of pitch up to 87-90% has been obtained by blowing air through the tar and gradually raising the temperature, the loss of oil being prevented by refluxing the vapours. Various compounds—*i.e.*, alkalis, sulphuric acid, &c.—appreciably accelerated the reactions. The resultant pitch is stated to be equal to the normal product in its briquetting properties. This process recalls the Broadhead process which is being used in Australia for the conditioning of light vertical tars for road purposes.

Benzole Extraction.

The growing practice of benzole extraction is indicated in many ways, one of which is the increasing volume of technical literature devoted to this subject. The recent rise in petrol prices and the rumour of still further advances have stimulated the extraction of benzole, and many undertakings are now installing plant for this purpose, the most recent installation to be described being that at Devonport (p. 565). Here, owing to local circumstances, the plant is placed prior to the purifiers, which, although contrary to the usual practice, does not appear to have any ill effects. The plant comprises the usual washers, preheaters and still, the fractionating column of the latter being thermostatically controlled. Gas oil is used as the washing medium, and a yield of benzole of three gallons per ton of coal is obtained together with a reduction in the naphthalene content of the gas to 0·53 grain per 100 c.ft. Thickening of the wash-oil and deposition of sludge occur and necessitate the removal of the oil once every three months. The refined spirit is produced to the specification of the N.B. Association and is utilized by the local transport services. Over a period of four months the average cost of manufacture was 8·697d. per gallon.

Further details have now been published (p. 269) regarding the plant erected at Beckton for the removal of benzole by activated carbon. In this plant, stated to be probably the largest in the world, 75 million c.ft. of gas can be treated per day yielding 16,000 gallons of benzole. There are eight adsorbing vessels equipped with the necessary condensers, &c. When the carbon becomes saturated with benzole the adsorber is taken out of circuit and the benzole removed by steaming, a process requiring 20-30 minutes, the benzole being recovered by separation from the condensed steam. After use for some time, the adsorptive capacity of the carbon decreases owing to the accumulation of adsorbed polymerized hydrocarbons, but it may be regenerated by heating to 1100°-1300° F. in a muffle furnace. The benzole produced is nearly water white, its specific gravity is 0·8745, and it contains 90-95% of benzene and toluene. A yield of 3¼ gallons per ton of coal is obtained.

The rectification of crude benzole by acid washing involves, in many cases, large losses (up to 15%) of the benzole, and now that an alternative to the acid washing test (*i.e.*, the oxidation test) has been approved, the difficulty which confronted other methods of treatment which gave a good product, but one which did not stand up to the stringent acid test, has been removed. The oxidation test has been formulated after much investigation work in various countries, the results of which have been incorporated in the now standard international test. This test, together with some of the difficulties which were encountered in its formulation, have been described by Hoffert and Claxton (p. 494). The test consists in passing oxygen at a specified rate for a definite time through benzole, which is heated in a bath of boiling water. The benzole vapours pass into a reflux condenser, the temperature of the water leaving the condenser being below 25° C. The details of size of flasks, &c., are very carefully specified, since many factors—*i.e.*, exposure to light, material from which apparatus is made, &c.—may appreciably influence the results obtained. After the required volume of oxygen has been passed, the benzole is distilled off and evaporated in a pyrex dish and the residual gum determined. In discussing the value of a test of this type, distinction is made between the "existent" gum—that is, the gum present in the sample before oxidation—and the gum formed by the oxidation. The above test gives the sum of these two. The "existent" gum alone may be determined by evaporating the benzole as above without the preliminary passage of oxygen. Obviously the test is not an indication of the gum formed by oxidation on storage indefinitely, but figures are given showing that for storage of 3-4 months a similar test to the one now adopted gave results which were generally a good indication of the gumming tendency of a benzole.

A number of the methods of benzole rectification, which have been recently introduced, have been examined by the Benzol Association at Bochum (p. 856), the normal acid washing process (by which standard benzole was obtained) being taken as a basis. Most of the processes examined were found to be inferior to the acid washing method, but by the use of 80% acid a satisfactory spirit could be produced. In this country the "Inhibitor" process of the National Benzole Association will probably tend to replace

the acid washing process. By the addition of small quantities of tricresyl (one part in 10,000) and similar compounds the formation of gum from unsaturated hydrocarbons is prevented, and these compounds, which were formerly removed by acid washing, remain in the benzole (p. 569).

Ammonia.

The Ammonia and Effluents Committee of the Institution is still pursuing its investigation of the ammonia problem in general and particularly of the methods of disposal and treatment of effluent liquor (p. 11, Supp., Oct. 26). The fact that many works are now disposing of ammoniacal liquor in various ways has extended the investigation to the treatment not only of effluent liquor but also of crude ammoniacal liquor. Experimental treatment of the crude liquor has been carried out on a large scale in bacteria beds at Coventry, and the results indicate a fall from 80% to 50% in the purification effected as compared with effluent liquor. At Cheltenham, crude liquor is being successfully treated in this way, but the quantity of liquor which can be thus treated is strictly limited. The general inference would be that, where there is ample plant for sewage treatment, no technical difficulty should arise, although the cost of treatment is naturally higher than that for effluent liquor. Various methods of treatment of effluent liquor at the gas-works are still under discussion by the Institution. Further work on the extraction of phenols by tricresyl phosphate confirms the suitability of this solvent, although doubt is expressed regarding its stabiltiy in continued use. Details are given of German plants using this solvent, and the high price of the solvent is noted. Preliminary experiments with tar oils suggest that some fractions of these oils may be of use as solvents for phenols, and that their value in this connection is largely determined by the percentage of bases present.

In regard to the treatment of effluent liquor in bacteria beds, work carried out on an installation at the Coventry Gas-Works indicates that the purification thus obtained is not complete and that final treatment at a sewage works is necessary. The process is an expensive one, and the view is expressed that any bacterial purification should preferably be carried out wholly at the sewage works. A plea is made for closer co-operation in this respect with the authorities responsible for sewage disposal.

In regard to the major problem of reducing the loss of revenue on ammonia products—for this is now the position in practically all undertakings—there is little to note. The recently issued prices of sulphate of ammonia over the next six months (p. 578) are slightly higher than those of the preceding months but still lower than those of the corresponding period of 1932. At the moment there seems little hope of any improvement in this respect, and where sulphate of ammonia manufacture is still being carried out the accounts for 1932 will probably show increased losses. The wholesale destruction of liquor is deprecated from various aspects, and a further fall in the value of spent oxide as a result of the reduced output of sulphuric acid is foreshadowed. Attention is drawn in the report of the Ammonia Committee to certain economies which may be effected in sulphate manufacture and to the possibilities of manufacturing a concentrated liquor. In regard to the latter, details have been given (p. 426) concerning a newly erected plant at Lea Bridge designed to produce liquor containing 15% NH_3. The plant is apparently similar to that erected at North Berwick, and the supply of liquor and steam is automatically controlled so as to give constant working conditions. The economics of this plant are not quite so satisfactory as those reported from North Berwick (p. 645, vol. 199) the cost of disposing of the concentrated liquor being 3s. 6d. to 4s. per ton on the crude liquor. The effluent from the plant is being discharged into the sewer.

Complete working details regarding the phenol extraction plant at Partington have now been published (p. 687). During a period of 13 months some 4½ million gallons of liquor has been treated and 23,700 gallons of crude phenols extracted. The plant has worked satisfactorily, but the loss of benzole was greater than had been anticipated and amounted to 1·85 gallons per 1000 gallons of liquor. The reason for the large loss of benzole is not clear since only 0·4 gallon per 1000 gallons of liquor is accounted for in the liquor leaving the plant. The effect of the phenol extraction is to reduce the oxygen absorption value of the liquor by about 75%. The phenols extracted contain about 75% of crude carbolic and cresylic acids, and are valued at 1s. per gallon. Over the above period of 13 months the cost of phenol extraction has worked out at 2s. 5·7d. per 1000 gallons of liquor treated, equivalent to about 12s. per ton of sulphate of ammonia made.

Storage.

The problem of determining the maximum wind pressure and the resulting pressure on gasholders has been discussed in a comprehensive article by Milbourne (p. 149). With regard to the question of the wind velocities obtaining in this country at different altitudes, various formulæ have been suggested, and for spiral holders not exceeding 250 ft. in height, the expression $V = v \left(\frac{H}{h}\right)^{0.2}$, where V = velocity at height "H" and v = known velocity in miles per hour at height "h," would appear satisfactory for practical purposes. Comparison of results obtained by calculating the total pressure concentrated at half the height of the holder and by allowing a varying pressure at different heights indicates that, for heights up to 250 ft., it is safe to take a uniform value of 35 lbs. per sq. ft., the centre of pressure being at half the height of the holder. In regard to the distribution of the wind pressure over the side plates of a holder, a number of experimental determinations are on record, and these are briefly discussed. When graphically plotted, it is seen that the pressure progressively falls from a point normal to the wind flow to zero at an angle of about 35 degrees either side of this diameter, while the remainder of the surface is under a varying suction. The available data have been determined on small models, and until values of Reynolds criterion for full-scale holders have been determined, the above data can only be regarded as provisional. Closely associated with the wind distribution is the "drag" or shape coefficient of a holder, for which the value 0·57 is proposed. Experiments on models show that a suction is exerted over the whole crown of a holder. Irminger's determinations are considered to be the most satisfactory, these giving the mean suction as $0{\cdot}43p$, where "p" is the normal wind pressure.

The choice of a gasholder is becoming more complicated as the diversity of types increases, and the recent article by Segelken (p. 618) is welcome, as indicating the factors to which consideration should be given when comparing high and low pressure holders. While it is impossible to generalize on this subject, owing to the number of factors involved, it may be said that for holders up to 350,000-420,000 c.ft. capacity the pressure holder is cheaper than the ordinary type. The proviso is added, however, that the relation between the diameter and the pressure must be such that plates not less than 0·28 in. thick are required, since this is the smallest gauge permissible, irrespective of gas pressure or holder diameter.

In regard to shape, the sphere is preferable for large holders, as this allows the minimum weight per unit capacity. Where pressure holders are proposed solely for storage, an arrangement of three holders parallel with each other and with the works outlet main is suggested. No other holder is required; one of the three pressure holders is reserved for balancing the daily fluctuations, one for more infrequent fluctuations, and one solely in reserve. By such an arrangement the quantity of gas compressed may be very considerably reduced.

Tar Oil Spraying.

Use in Apple Orchards.

Probably the introduction of the tar distillate wash as an effective winter spraying agent, stated a recent issue of "The Times," has done more to accustom the farm orchardist to pest control than any other single thing. Although it is but a few years since this process was generally established, it has now become almost an accepted rule that at least some portion of the farm orchards should be treated each year.

The tar distillate appeals because of its obvious cleansing properties. It clears off the lichens and the moss and gives the trees a healthy, bathed appearance that suggests strength and vigour. A keen farmer is always proud to display his orchards when they have been tar sprayed. The trees always show good value for this encouragement. It is, however, in its actual control of caterpillar and similar pests that the tar distillate gives its greatest justification. By sealing the eggs the larvæ are prevented from hatching out, so that thousands of leaf-eaters do not come to life.

The total cost of material, labour, and hired machinery works out at about £3 10s. to £4 per acre—varying, of course, according to the size of the trees and the convenience of the orchard. The next few weeks will see considerable activity in the orchards, since the end of February or very early March is late enough for this work, as the trees must be dormant. This wash is relatively easy to mix and not very difficult to apply, and any material left over will keep.

Joint Gas Conference

The Joint Gas Conference arranged by the Institution of Gas Engineers, the Society of British Gas Industries, the British Commercial Gas Association, and the National Gas Council was opened at the British Industries Fair, at Castle Bromwich, Birmingham, on Tuesday, Feb. 28. In the absence owing to illness of Sir Francis Goodenough, the chair was taken by Dr. G. C. CLAYTON, M.P. (Chairman of the Liverpool Gas Company).

Before the ordinary work of the conference commenced an official welcome was given to the delegates, on behalf of the City of Birmingham, by the LORD MAYOR (Councillor H. E. Goodby), and on behalf of the Fair Management Committee by Mr. C. E. GREENER, the Chairman of the Committee.

Dr. Clayton was also supported on the platform by Sir Russel Bencraft (Chairman of the Southampton Gas Company), Mr. William Cash (President of the B.C.G.A.), Alderman J. H. Lloyd (Chairman of the Birmingham Gas Committee), Mr. R. E. Gibson (President of the Institution of Gas Engineers), and Dr. E. W. Smith (Chairman of the Gas Section of the Fair).

CIVIC WELCOME.

In according the delegates to the conference a civic welcome, the LORD MAYOR said that was the fifth successive year that the Gas Industry had organized a Gas Conference to take place during the run of the Fair. Throughout past years of the Fair's life, the Gas Industry had identified itself very closely with the object of the Birmingham Chamber of Commerce and the Fair Management Committee. Birmingham had always been regarded as the cradle of the Gas Industry. It was in Birmingham that the genius and perseverance of William Murdoch—who worked throughout his life for the renowned firm of Boulton & Watt—made the foundations of the Industry as a sound commercial proposition and a public amenity of the greatest possible value to the people of this country.

If their Chairman was able to trace his descent from the Reverend John Clayton, it would be yet another example of the long arm of coincidence. In its long history, the Gas Industry had always endeavoured to take advantage of the most recent developments of engineering and chemical science, and it was no doubt because of this high tradition, combined with sound financial methods and a policy of service towards its customers, that the balance-sheets of the large gas undertakings which had been published during the last few weeks were able to show such satisfactory results of their year's workings, in spite of the difficulties which were facing them to-day.

He thought they could claim that the City of Birmingham had taken its full share in promoting the expansion of the Industry, and in this connection he desired to pay tribute to Alderman J. H. Lloyd and Mr. A. W. Smith. No doubt the Industrial Research Laboratories and the Heat Treatment Shops of the Birmingham Gas Department were known to all of them, and Birmingham manufacturers owed a debt of gratitude to the Department for the enormous amount of research work which it had undertaken in collaboration with the industrial firms in this city.

He had already made an inspection of the Gas Industries Section at the Fair, and he had been struck with the manner in which, by means of their colour scheme and their Central Information Bureau, they had preserved the entity of their own Industry in the centre of the Fair. He understood that this year the Section occupied a greater area than in any previous year, and that had additional space been available, many of the exhibitors would have been prepared to display their goods on an even more elaborate scale than had been done.

The engineers of the Industry were very much separated geographically one from another, for every town in the country had its gas-works, whereas the majority of the other great industries in the country were usually centred more or less in one district or in a group of neighbouring towns. This geographical isolation rendered greater the need for conferences, and he had no doubt that their meeting together at the Fair would prove of the utmost assistance and benefit.

A FINE DISPLAY.

Mr. GREENER said probably the Gas Section was the finest display even in the magnificent display which they had this year. He said some years ago that he thought the Gas Industry was declining but he was pleased to know their associations had so organized matters that the development of gas and its uses were expanding at a greater rate than possibly any other industry in the country.

The CHAIRMAN, in thanking the Lord Mayor for his welcome, said they all appreciated the great work which Birmingham had done for the Gas Industry; they were very much alive to what had been done in regard to the industrial use of gas, and they looked to Birmingham to assist them even still further in that direction.

In thanking Mr. Greener, the Chairman said he was glad to know that he had learned the Gas Industry was not declining. "We are very much awake and alive," said the Chairman, "and we intend to go on prospering and holding our own against any competition that comes against us."

The following telegram was sent to Sir Francis Goodenough: "President and members of the Joint Gas Conference assembled at the British Industries Fair, Birmingham, send cordial greetings and congratulations on your recovery."

PRESIDENTIAL ADDRESS

By Dr. G. C. CLAYTON, C.B.E., J.P., M.P., Chairman, Liverpool Gas Company, Vice-President, British Commercial Gas Association.

A warm friend of ours is absent to-day. Sir Francis Goodenough was to have presided at this Conference. But, as we all know, he has just undergone a serious operation; and though I am glad to say he is well on the road to complete recovery, he is prevented from taking his rightful place among us this morning.

I am particularly sorry that Sir Francis cannot be with us, because the occasion would have suited his temperament so well. I know his deep interest in the British Industries Fair, and his faith in its success. The conception of the Fair as a national shop window, a display of salesmanship on the grand scale, is in key with his own ideas. We in the Gas Industry have reason to know his infectious zeal and energy in the cause of salesmanship. It is due to him in no small measure that our Industry has organized itself so effectively to co-operate in giving the maximum service to the consumer. Day in and day out Sir Francis has preached the necessity for better salesmanship and better service on the part of the Gas Industry. He has done more—he has implemented his preaching by that rare mixture of charm, adroitness, and courage which is peculiarly his. It was no surprise to us when he was appointed Chairman of the Government Commission on Education for Salesmanship—a Commission whose findings have evoked the greatest interest among progressive employers. And now I see with pleasure that Sir Francis has been appointed to the Post Office Advisory Council—a body which also is concerned with better service to the public. To us these activities of Sir Francis will seem a natural sequel to the work he has done and is doing in the Industry which is nearest his heart.

I know you will join with me in wishing him a speedy restoration of health.

It is a happy omen that at a time when the world is still in the stranglehold of economic depression, the British Industries Fair should be greater and more representative than ever before. That it should be so clearly indicates unshakable confidence in the future of British Industry on the part of those who carry it on, and a supreme belief that British goods, however and wherever challenged, have only to be seen in order that their superlative merits should be recognized. It gives the lie to those who, with varying degrees of pessimism and to the great disservice of their fellow-countrymen, suggest that industrially we have passed our zenith. It shows beyond peradventure that British Industry, despite world-wide depression and its attendant evils, is as virile as ever and able to adapt itself to changing economic conditions, and to equip itself in all respects to take full advantage of the recovery of which, in

my judgment, the signs are surely, if slowly, manifesting themselves.

Here, and in London, we have, so to speak, under one roof practically every Industry in the country represented, and while each is there primarily to advertise to the world the progress which it has made, the technical improvements which it has effected and the lines along which it is developing, the joint endeavour is indicative of that nation-wide unity of purpose which in the industrial as in other spheres is necessary if we are to overcome our difficulties and retain our predominant position.

In this joint endeavour the Gas Industry plays, as it has played in the past, a part worthy of its position as one of the country's greatest and most important industries, and in accordance with usage we who are representative of all sections of that Industry are meeting to confer together, having before us the great object-lesson which the Fair provides.

Present Position of the Gas Industry.

To-day, however, I propose for a few minutes to try to take stock of the position of the Gas Industry as it presents itself to one who, while directly connected with, and deeply attached to, the Industry has—fortunately or unfortunately—many other interests and responsibilities. As Chairman of the Liverpool Gas Company on the one hand, and a Member of Parliament on the other hand, I have pondered from time to time as to what we in the Industry have achieved in the past without that assistance from Parliament which we might have anticipated, and what we could accomplish in the future if Parliament were to lend us a helping hand by passing the amending Gas Legislation for which the Industry has been pressing for so many years, and which is so urgently required. We in this room know full well what the Industry has achieved, and it is as well that the world should know also.

I recall the early struggles against prejudice and ignorance. I recall the answer to the challenge of electricity when gas, hitherto regarded only as an illuminant, successfully insisted on its outstanding merits as a fuel for domestic use and was thus brought into direct competition with coal. I recall the coming of oil, at first in trivial quantities, but now a fierce rival, abundant in supply, cheap in price, and adapted for countless uses. I recall the demands suddenly made upon the Industry during the great war for changes in manufacturing methods in order to produce explosives, and how splendidly they were met.

Since 1902 the output of the British Gas Industry has been more than doubled. The number of consumers is still steadily increasing, and to-day there are more than ten million, domestic and industrial, on the books of the gas undertakings. That means that practically every family in an area of gas supply is using gas for at least one purpose; and most families use it for many purposes. Seven million housewives, for instance, cook by gas. And yet, even in respect of this load, we are not in sight of saturation. In the meantime the number of gas appliances, devised for almost every conceivable purpose in the home, is growing every year. The most cursory visit to the Gas Section of the Fair will show that the inventors and technicians of the Industry are more than keeping pace with the rapid changes in social conditions and needs. I defy any housewife to inspect the apparatus on view in this section and not find some new appliance that will increase her comfort and leisure, shorten her working hours, and add to the amenities of her home.

There can be no doubt of the preference of the ordinary householder for gas, even in the face of such unfair restrictions as the Kettering Gas Act sought to prevent. I have a particular case in mind. A new block of flats was recently erected by a London Borough Council, and it was at first decided to exclude the use of gas from these flats. Wiser counsels finally prevailed. The tenants were given a choice of fuel for various domestic purposes. No less than 86% chose gas for cooking, and 81% chose gas washcoppers. I think this provides an object-lesson for some of our Village Hampdens.

Town Gas in Industry.

When we turn to the industrial field for town gas, it is not too much to say that its potentialities are staggering. Well over 3000 trades in Great Britain to-day are using gas for an average of seven processes in each trade. There are areas in this country where the industrial load amounts to a third, or even a half, of the total output of gas, and this in spite of fierce competition and intense depression. And yet we are only on the fringe of the industrial market that waits to be tapped. For gas, as the modern fuel for modern processes, is being adopted by the progressive industrialist, and it is he who will set the pace in the era of rapid and intensive development which will follow the depression.

It must not be forgotten, in the shortest review of the Gas Industry's activities, that its ramifications are far-reaching and of extreme importance. Last year the making of 330,000 million c.ft. of gas involved the production of 12 million tons of coke and 210 million gallons of tar from which many valuable bye-products were obtained. The recovery of benzole is a further aspect that deserves the closest attention from a national viewpoint; and all of you here will be interested in the gas liquor concentrating plant which can be seen at the Fair.

There are signs that the public are not blind to the immense and growing importance of the Gas Industry in our national life. The independent investor is fully alive to the soundness of Gas Stock.

The ordinary investor to-day is playing for safety—and safety is not easy to find. I think, too, that he is well content to put his money into an Industry that is not merely a money-making concern, but is regulated and directed to be of the utmost possible service to the public at large. We have lately had opportunities of seeing how high Gas Stock stands in the minds of the investors. For the investor who looks for a secure return and has his eyes open to the immense possibilities of development, there is no more attractive investment than Gas Stock.

In this review, however, of past achievement, it must not be thought that we regard our task as accomplished; we are merely satisfying ourselves that the foundation has been well and truly laid and that the structure is capable of withstanding the demand which the future will inevitably make upon it—a demand the nature of which can already be discerned, although its immensity is hard to estimate. And so it is I ask myself, "What of the future?"—assuming, of course, as I do, that Parliament accords to the Industry the greater measure of freedom which the commercial nature of its operations requires. These requirements are familiar to everyone in the Gas Industry, but I might mention the most important—namely, greater facilities and less cumbrous machinery for raising capital, wider powers for taking and giving bulk supplies, and for co-operation between undertakers *inter se* and undertakers and allied industries; and, lastly, greater elasticity in methods of charge.

A Welcome Report.

We all welcome the recent issue of the Interim Report upon Methods of Charge of the Gas Legislation Committee, which goes a long way to meet the needs of the Industry, and I am glad also to learn that there is every prospect that in the next few weeks the Final Report of the Committee will be published, so that Parliament will then be in a position to take immediate steps to give effect to their recommendations.

The history of the Industry is in itself a convincing proof of the fact that it can be counted upon to make the maximum endeavour on its own behalf. The instincts of self-help and self-reliance have naturally become very highly developed in the absence in the past of a reasonable measure of assistance in the form of legislation, and in the face of competition which has steadily become more fierce and more varied. Once, therefore, the Gas Industry is armed with these powers, an alluring vista unfolds itself. I can imagine the Industry in the future consisting of large administrative units, co-operating with allied undertakers, and universally recognized, save for a few exceptional purposes, as the fuel supplier of the country. It is certain that Industry in this country will, as time goes on, demand that their fuel shall be gaseous. There is no doubt that by this means the coal industry would benefit and the invasion of imported oil would be checked; gas undertakers would not only be assisting themselves, but would be rendering invaluable service to the community, helping in their own way to restore prosperity to industry and mitigate the evil of unemployment.

To achieve this end, however, effort—both individual and co-operative—is called for as it has never been called for before, and I was more than delighted to remark the enthusiasm with which the proposals put forward by the three National Bodies at the meeting which I had the privilege of attending early this month in London were received.

A Scheme to Support.

Everyone in the Industry should give their whole-hearted support to the scheme which the National Bodies recently laid before them. The needs of fuel users are multifarious, and while in the past they have been met in large measure by the efforts of individual undertakings up and down the country, the time has come for the closer co-operation and co-ordination which the scheme proposes. Nor can any undertaking afford to remain outside the scheme.

There is, perhaps, in some cases a disposition to think that no further business can be secured, but a census of every town and village, even the smallest, will undoubtedly reveal the fact that requirements, often considerable,

which can and should be met by gas, exist, and the knowledge which will be disseminated through the medium of the machinery which is now being created will enable those requirements to be met in the most efficient and up-to-date manner. I am confident, therefore, that a scheme which is so full of promise will be accepted and supported throughout the Industry with the same enthusiasm as marked its reception at the conference.

The speeches at that meeting indicated beyond all doubt how vast was the field for gas for industrial and commercial purposes. The few examples given from my own City of Liverpool by Mr. Gibson (President of the Institution of Gas Engineers) show how varied are the uses to which gas can with advantage be put.

In fact, the purposes for which gas can be utilized are almost without limit. Sir David Milne-Watson, in his annual address to shareholders, said that his Company was serving 14,000 factories, and if I were to make inquiries of the City of Birmingham's most efficient Gas Department—to whose pioneer efforts in this regard I should like to pay homage—these figures could no doubt be yet further increased.

One fact, however, must be stressed and emphasized again and again. It is this. That this is business which must be sought for and obtained by the initiative of individual engineers and managers; it will not come automatically. In the past in this country we have not, perhaps, pursued the policy of pushing sales of gas for large-scale uses, such as water-heating, central heating, air-conditioning, and for industrial purposes, with the vigour that we might have done, and we have certainly fallen far short in this regard of the achievements of our American colleagues. It is however, "never too late to mend."

As President of this Conference, I should like to congratulate the Committee on the wise choice that has been made not only with regard to the papers which are to be read during the conference, but also upon the most interesting and varied exhibits of industrial furnaces and other plant and apparatus, which I hope will not only prove to the world at large what gas is capable of doing, but will encourage an immediate expansion of the gas sales for the many and diverse uses to which it can be put.

I should like particularly to draw your attention to the Joint Industrial Gas Exhibit—a new feature of the Fair—which has been arranged under the auspices of the British Commercial Gas Association in co-operation with the Birmingham Corporation Gas Department, the Gas Light and Coke Company, and the Sheffield and Newcastle Gas Companies. The stand, though small, carries an impressive range of industrial apparatus. It is staffed by expert industrial salesmen lent by the gas undertakings concerned, and the visiting manufacturer who brings his own heating problems to the Fair will find the staff able to propound cases parallel to his own, in which the application of gas has led to better results. I think it is a matter of satisfaction to all of us assembled here that the co-operative spirit of the Industry should lead to such notable enterprise. I hope that it will be possible, at next year's Fair, to repeat the Joint Exhibit on a bigger scale.

Compressed Gas for Motor Vehicles.

There are two further aspects of the Gas Industry's display at the Fair to which I should like to refer.

One is the striking demonstration of compressed gas for motor vehicles which has been carried out by the Industrial Research Laboratories of the City of Birmingham Gas Department. Most of us have read the Press accounts of the very successful trial runs which have already been made, and a great deal of interest has been excited, not only in this country, but among foreign buyers who have attended the Fair. It is a development of extraordinary moment to all of us to-day, and the possibilities of its extension will be followed with the closest attention.

In illustrating another and extremely important aspect of the Gas Industry's activities, the British Road Tar Association has adopted a compelling way of telling its story to the public. The use of the talking film as a vehicle of propaganda is still in its infancy, but I think it is a facet of salesmanship that well deserves our investigation.

I take this opportunity—if I may—on behalf of you all, of tendering to the exhibitors our very best thanks for the trouble and expense to which they have gone to ensure that the Gas Section shall be second to none. Their endeavours, aided by your energetic and experienced Committee, will, I am certain, ensure that this year's Fair, so far as the Gas Industry is concerned, will prove more successful even than those that preceded it. I only wish that every Member of Parliament could see personally our Gas Section here, as this would be the surest proof of the potentialities of gas to help industry—unfortunately now so depressed—and would convince them, I am certain, of the immediate necessity for a speedy and easy passage through Parliament of the legislation which is so urgently required to enable our policy to come to full fruition. I believe, however, that the prospects of action at Westminster are much brighter than they have ever been before, and I can assure you that as far, at any rate, as I am personally concerned, no effort will be spared to ensure that justice shall at long last be done to the Industry.

Vote of Thanks.

Mr. Cash, in proposing a vote of thanks to Dr. Clayton for his address, said he had told them of the legislation which was wanted, and no doubt he would be able to persuade the House of Commons how important this legislation was. He was glad also that he had addressed them as an optimist; he was not one who thought the Industry was moribund but he had pointed out the way in which they might go ahead. In reference to investments, he said he thought the public were paying attention to one factor in connection with gas stocks, and that was the "clean finance" which prevailed. The public knew the companies were well conducted and honestly and fairly. There had been no watering-down of the profits of the undertakings which stood financially in a strong position. He had been connected with the Gas Industry for forty years and he had been impressed by the fact that people who had put their money into gas undertakings had no cause for regret. In regard to the Interim Report, Mr. Cash spoke of the extremely valuable work which had been done by Mr. A. W. Smith, of Birmingham, and Mr. T. P. Ridley, of Newcastle. It was appropriate they should acknowledge there what they had done during the long and arduous deliberations of the Committee.

Mr. Gibson, in seconding, said he agreed with Dr. Clayton that they could congratulate the exhibitors on the splendid show they had put up this year. He was sure they all greatly appreciated the efforts that had been put forward and were grateful to the Committee for the arrangements which had been made to assist the British Gas Industry.

Dr. Clayton briefly replied, and the members of the conference then made a tour of the Fair.

LUNCHEON SPEECHES.

The delegates to the conference were entertained at luncheon under the chairmanship of Dr. Clayton.

Mr. L. S. Amery, M.P., in proposing the toast of "The Gas Industry," described it as both a producers' and consumers' industry. It employed something like 113,000 workers and approximately £200,000,000 in capital, but beyond that it was becoming in an increasing measure an essential element in manufacturing production, and more and more was superseding coal, not only on account of cleanliness, but also as the most efficient and economical method of applying heat. Some 3000 trades with an average of seven processes in each made use of gas for heating, and again the bye-products of gas—ammonia sulphate, tar, and coke—were in themselves important constituents among the raw materials of our great national industries. On the other hand, no one would deny that it was a great consumers' industry. They were informed that 90% of the cooking was done on gas stoves, and that certainly touched the consumer very nearly, while the Industry also touched the national life on innumerable points, and its prosperity must obviously in a large measure be dependent upon the general level of prosperity of the country. Speaking of the future, Mr. Amery remarked that he was one who believed that their prospects in this country had never been so good, if only they had the courage as a nation and as individuals to make use of their opportunities and to tackle their problems with an equal measure of vision, confidence, and determination. The Gas Industry had held its own and more than its own against electricity and oil, while it continually improved its methods and developed new uses for its products; and who was going to say that it was a stagnant or decadent industry? Through being the first in the field, it had been subject to restrictive legislation to which its successors had not been subject, and it was only last year that the first step had been taken to free the Gas Industry from legislative trammels. He hoped it would not be long before the Industry was put on a level of fair and equal competition with its rivals.

The Chairman, in responding, said he believed that in this country and in the Empire they were quite capable of setting the speed of recovery at a reasonable rate. He thought they had already made a considerable start, and they were now going to increase that speed. From his own experience in the chemical trade, which they claimed was the barometer of trade generally, he was satisfied that every industry at the present moment in the country was on the upward grade. Reference had been made to salesmanship in the Gas Industry. It was due to Sir Francis Goodenough that they had developed that side of the Industry, but there was always room for improvement. In every district they found there were opportunities which had not yet been tapped for selling goods, and certainly Birmingham has set an example in the way of inducing industries to adopt gas as their source of heat for industrial purposes.

WEDNESDAY'S PROCEEDINGS.

There was a large attendance upon the resumption of the Joint Gas Conference at the British Industries Fair at Castle Bromwich on Wednesday. The chair was occupied by Mr. R. E. Gibson (President of the Institution of Gas Engineers) who was accompanied by Alderman J. H. Lloyd (Chairman of the Birmingham Gas Committee), Dr. E. W. Smith (Chairman of the Gas Section), and Mr. H. C. Smith. The subject of the Conference was "The Industrial Uses of Gas," upon which a paper was read by Lieut.-Col. W. M. Carr, Engineer and General Manager, Stretford and District Gas Board.

The first part of Col. Carr's paper was published in the "JOURNAL" last week. The second part, together with a report of the discussion, is on later pages of the "JOURNAL" to-day.

The CHAIRMAN explained that Dr. Clayton would have presided at the session but for the fact that he had an engagement of long standing in London. The subject which they were to discuss was very much in the minds of gas engineers and administrators at the present time. One of the most interesting features of the Gas Section in the Fair was the display of industrial appliances. It was also appropriate they should discuss the subject in view of the meeting of the Gas Industry held recently in London. The district centres which were then advocated had already been formed in London, Birmingham, Sheffield, Cardiff, and Newcastle, and the intention was that similar centres should be formed to cover the whole country. In view of the strong competition with which they were faced it was of the utmost importance that existing and prospective customers should be shown how to apply gas with the greatest degree of efficiency. In most cases it was the ultimate cost of the heating process that was the deciding factor when they were competing with other forms of fuel, and the efficiency of use affected the ultimate cost to a profound degree. Therefore they must pay particular attention to efficiency in all industrial and commercial gas appliances. They were very fortunate to have Col. Carr to address them on the important subject, because it was a matter on which he was well qualified to speak, as he was the Gas Engineer of an undertaking right in the midst of an industrial district.

LUNCHEON.

Members of the Conference were entertained at luncheon by the Birminham Chamber of Commerce. Mr. WALTER L. CHANCE, Senior Vice-President of the Chamber, who presided, proposed the toast of "The Gas Industry."

Mr. CHANCE said members of that Industry had all along been their most loyal supporters. They came at the beginning and had been increasing their space ever since, and had all along supported the Fair Management in every possible way. Another reason for which they had a high regard for the Gas Industry was that the Gas Section always appealed to them as being perhaps the most live section of the whole exhibition. On the stands they had available men of unusual intelligence who were obviously experienced in the best sense of the word. Every detail of the trade was covered, and the co-operation between the various branches was so thorough that the Gas Industry was bound to progress. Although, however, they had co-operation in that one exhibit, it would be comparatively useless were it not for the response made by the gas engineers and the departmental chiefs who visited the Fair every year and found they could really do business and save themselves a lot of thinking by taking in what they saw at the Fair itself. That was what those who were managing the Fair were anxious to see—that the Fair really brought business and that it showed all the new developments and ideas.

Mr. R. E. GIBSON (President of the Institution of Gas Engineers), replying to the toast, said they in the Gas Industry had a very high regard for Birmingham, not because of its past in relation to the Industry, but because of the present. They admired the activities of the Chamber of Commerce and also the enterprise and initiative of the City of Birmingham Gas Department under the able leadership and control of Mr. A. W. Smith. The work done by the staff of that Department had had a beneficial effect on the Industry far beyond the confines of Birmingham. As an Industry they were glad to be associated with the Fair, and great credit was due to the Committee who organized the Gas Section and to individual firms who had stands in the Section. The Section was worthy of the Industry, and it would be a great stimulus to gas business not only in Birmingham but throughout the country and also abroad. Gas, Mr. Gibson continued, had been looked upon by many as simply an ordinary public utility supply, like water on tap, for anyone who cared to use it for domestic purposes. But it was really much more than that to-day. It had become a competitive factor in commercial and industrial fields. Dr. Walter had referred to gas service as being important to-day. The idea of "gas service" instead of "gas supply" was coming more and more to the front, and they realized they had to look after the consumer right up to the point of consumption, and not be satisfied with simply giving a gas supply. Gas could be used for so many purposes. They had illustrations of this at the Fair. They were proud of the fact that the gas-works process for the treatment of raw coal was highly efficient, producing in the form of gaseous and solid fuels materials convenient in use, smokeless, and easily applied and controlled. Their parent industry, coal, notwithstanding all that had been done, assisted by legislation and artificial control, was still in an unsatisfactory condition. They in the Gas Industry had a highly efficient process for dealing with coal and rendering it far more effective in use for almost every purpose. He could not help thinking that in this treatment would lie, to a large extent, the solution of the coal problem. He hoped the day was not far distant when the burning of coal in the domestic grate would be prohibited; it was wasteful and dirty. The pollution of the atmosphere of their great towns and cities by soot and smoke was serious. How much pleasanter life would be if they could have a clear atmosphere where sunshine could have free play!

THURSDAY'S PROCEEDINGS.

The Conference was continued on Thursday under the Chairmanship of Dr. Clayton.

The chief business at the last session was an address on "Gas and Gas Coke for Hot Water Supply" presented by the B.C.G.A. The address, which was read by Mr. J. G. Clark, Technical Adviser to the Association, will be published later in the "JOURNAL."

VOTES OF THANKS.

Mr. A. W. SMITH proposed a vote of thanks to Dr. Clayton for presiding. He had stepped into the breach owing to the regrettable illness of Sir Francis Goodenough. He also wanted to propose a vote of thanks to Mr. H. C. Smith for acting as Hon. Secretary of the Conference. They all knew he did his work admirably, and although every year he threatened it would be his last he thought they had better leave the future to take care of itself.

The resolution was carried.

The CHAIRMAN said he had learned a great deal at that Conference which he hoped with the help of his Engineer to put into practice. He thought the Gas Industry was extremely fortunate to have the "Smith family" to look after it. They had run that meeting to a large extent, and he had been passed from one to other of the members of the Smith family who had looked after him and put him right. Anything he had done or any success which had been obtained was entirely due to the Smith family.

Mr. H. C. SMITH said his job as Secretary was perfectly easy because he asked other people to do the work and everybody was very willing. The bulk of the work had been done by Mr. A. W. Smith and his staff, particularly Mr. Spinks and Mr. J. C. Walker and his staff, without whose assistance it would have been impossible for him to do anything.

Salesmanship in the Fuel Industries

By Dr. G. E. FOXWELL

The Institute of Fuel is young in years as compared with, for example, the Institution of Gas Engineers, but it is already old in accomplishment. Within its Fellowship are contained most of the great names of Fuel Technology in this country. It has scored another success by the holding of an informal discussion on Friday evening last, Feb. 10, when, under the Chairmanship of Dr. Dunstan, the gas, oil, electricity, and coal industries held a joint meeting. At this meeting Mr. V. W. Dale (electricity), Mr. C. Dalley (oil), Mr. W. R. Gordon (coal), and Mr. J. G. Clark (gas) each discussed in a short address salesmanship in their several industries. Following these addresses the meeting was thrown open for discussion.

The impression gained by a disinterested listener was that from the point of view of the coal industry, gas and electricity are to be regarded as allies and not as opponents. Oil plays the part of odd man out, unless—and this is very important—unless that oil is derived from coal. We have mentioned the point of view of the coal industry because that seemed to be the keynote of the meeting. There can be no question but that there is a definite wave of feeling in favour of the coal industry at the present time. Coal

may or may not be superior to gas, to electricity, or to oil. But the prosperity of the British coal industry is in a very real sense necessary to the national well-being. The coal industry has an opportunity that may never recur to establish itself as the predominant fuel industry. If it is to accept that opportunity several things must be done. First and foremost it must make the fullest use of its allies, whether those allies be gas or electricity. The Gas Industry must be the chief of those allies from the point of view of efficiency and from the point of view of price. That fact was clearly demonstrated at the meeting in question.

The speech of the evening, so far as concerns its " meat extract " value, was that delivered by Mr. Clark on behalf of the Gas Industry. The Gas Industry was put by other speakers on a pedestal that it should be the model for the Coal Utilization Council. The Gas Industry has spent many years of effort on research to aid the consumer. It has contributed its money unstintedly to the furtherance of that same object. From the results of the research and development work salesmen have been trained and are to-day sent forth equipped with technical knowledge such as is possessed by the salesmen of no other fuel industry. The coal industry can, indeed, justly claim to have spent much in research, but that research has been almost wholly directed to the mining of coal and to the prevention of danger to the workers in the industry. No attempt has been made to assist the coal salesman by providing him with technical information, nor has any effort been made to assist the coal user. It was roundly declared that the coal salesman was entirely ignorant of the material he attempted to sell. More, it was also averred that the coal owner was likewise ignorant of the fundamental facts underlying the technical utilization of coal. Mr. Seyler, for example, stated that he had not met a coal salesman who could answer the question why the consumer should be asked to pay twice as much for anthracite as for other classes of coal. Can the Gas Industry imagine a similar state of ignorance regarding the price of gas? That is why the organization, training, and personnel of the sales staff of the Gas Industry are held up as a model to the coal industry.

While the Gas Industry can sit back for a moment to survey with pride what has been done, their respite must be only momentary. Inherent in the situation as it was revealed at the Institute of Fuel meeting is also a grave hint of more intense competition to come. That competition may be long in developing, but it will almost certainly arrive. " We do not object to oil as oil," said Mr. Gordon, " but to the source from which it comes." Others pointed out that the contract between the Admiralty and Low Temperature Carbonisation, Ltd., for the supply of fuel oil to the Navy provided a valuable means for utilization of coal indirectly, a means to which the Coal Utilization Council gave its blessing. Supply of fuel oil upon those lines also necessitates a considerable expansion in the production of low-temperature coke. " We have proved . . . that there is a demand for the main product. . . . A big demand for it has developed among the less affluent classes "—those are the words of Dr. Carpenter. The Gas Industry must watch low-temperature carbonization more closely than ever before. If we may be very daring and hazard a conjecture, it would be that the next thirty years will see the virtual disappearance of high-temperature gas practice as we know it to-day, and that its place will be taken by some method—we carefully avoid saying low-temperature carbonization—that will leave far more gas in the coke than we do to-day.

Finally, there remains the conception of modern salesmanship. Salesmanship is not confined to the man who goes out at nine o'clock each morning with a black bag, and sits down and writes out his orders each night when he comes home. That old conception had been utterly discredited in the more scientific world in which we live. Many industries, and the fuel industries perhaps more than others, realize that the work of the salesman begins in the laboratory. Research and development are of fundamental importance. Unless you give the soldiers ammunition they cannot fight; unless you give your salesmen facts they are helpless. The Gas Industry knows that, and is therefore holding its own. Other industries are learning that lesson from the Gas Industry. The Gas Industry must begin thinking how it can go one better; and the sooner it starts acting the better it will be.

NOTES ON PLANT AND PROCESSES

An Attractive New Cooker.

The " Champion " gas cooker, recently placed on the market by Cannon Iron-Foundries, Ltd., of Deepfields, near Bilston, Staffs, and exhibited in two distinctive models on their stand at the Castle Bromwich Section of the British Industries Fair, embodies several features novel in gas cooker construction.

The oven is a specially designed bottom flue type, ensuring a large region of uniform temperature, with a cooler zone at the base, while its double insulation is stated to give an amazing increase of efficiency and to prevent condensate. An interesting point is that the oven supply pipe is carried down inside the wall of the oven, which makes for greater neatness, while the gas/air supply can be regulated by means of a worm screw from the front. Two designs of oven bottom tray are submitted—namely, the normal drip tin type and a simple enamelled sliding tray. The interior fittings of the oven are easily dismantled for cleaning and the whole of the interior of the oven is in mottled enamel finish.

The hotplate burners are of new standard drilled type, giving high efficiency combined with good combustion. Stability of the reversible poker burner in each position is ensured, the grill plates being of a special design. A particularly interesting feature of this cooker is its deep-fronted hotplate cornice, under which the chromium-plated drop-handle taps are completely hidden so long as they are in the " off " position. The mechanism of the tap is so arranged that as soon as it is lifted and turned on—be it ever so slightly—it remains in view. The gas supply pipe, injectors, and other adjustments are also situated under the deep cornice, hidden from view yet easily reached when necessary, the gas/air supply in this case also being simply regulated by means of a screw from the front.

The cooker is supplied with chromium-plated plate rack and the " Autimo " oven heat controller if desired, and the whole is finished in a charming blend of green, primrose, and cream enamels, as well as in light green when so required.

Cannon " Champion " Cooker.

The Industrial Uses of Gas*

By Col. W. M. Carr, T.D., M.Inst.Gas E., Engineer, General Manager, and Clerk, Stretford and District Gas Board.

(*Concluded from p. 558.*)

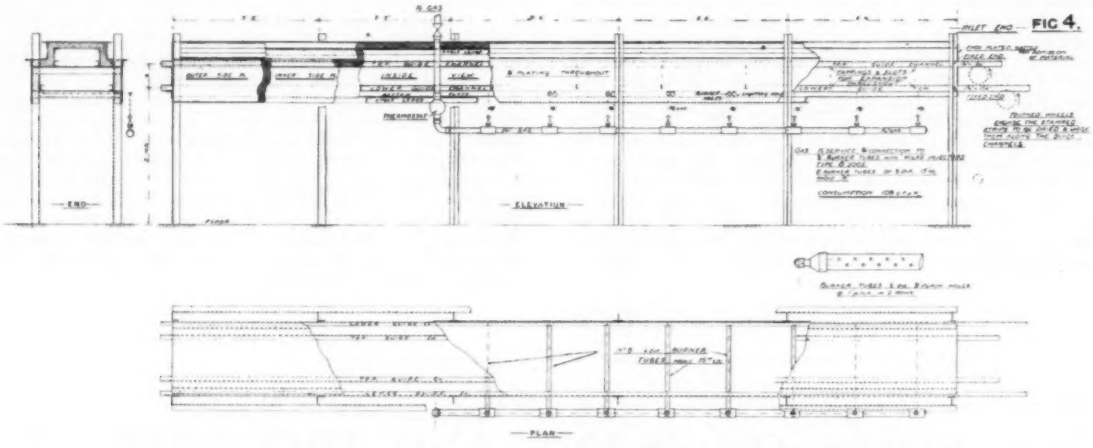
In addition to the reduction in gas consumption, the quality of the forgings is greatly improved, scaling is reduced to a minimum, and there is a substantial saving in subsequent machining costs. It is interesting to note that over a period of six months' normal working the consumption of gas during the working periods amounts to 4120 c.ft. per 1000 lbs. of metal heated. This compares very favourably with the test figure of 4016 c.ft. per 1000 lbs. of metal heated.

The comparative net fuel cost of gas as compared with oil at £3 1s. 6d. per ton is 4·17d. per therm. To the net cost of oil, however, must be added the cost of storing and handling the oil, and keeping it in condition during the cold weather, the saving of refractories due to longer life when using gas, the saving in metal due to less scaling and wastage, and the saving in cost of machining, *i.e.*, labour, power, wear and tear of machine tools, &c. Another not unimportant factor with this particular forge is the greatly improved working conditions for the men, particularly the atmosphere.

It is of particular interest to note the excellent results obtained in Newcastle-on-Tyne on gas furnaces working on heavy forging and drop stamping, as reported in the article to which earlier reference has been made (Industrial Gas Supplement, "The Gas World," 21st January, 1933).

The two gas-fired forging furnaces reported upon are use for locomotive and general heavy engineering forging, and it is stated that: "In work of this nature numerous reheats are necessary before the forging reaches its finished shape, and it is therefore unfair to give a con-

* Paper at the Joint Gas Conference, British Industries Fair, Birmingham, March 1, 1933.



INSULATED OVEN FOR DRYING LONG STAMPED STEEL UNITS PRIOR TO IMMERSION IN VARNISH

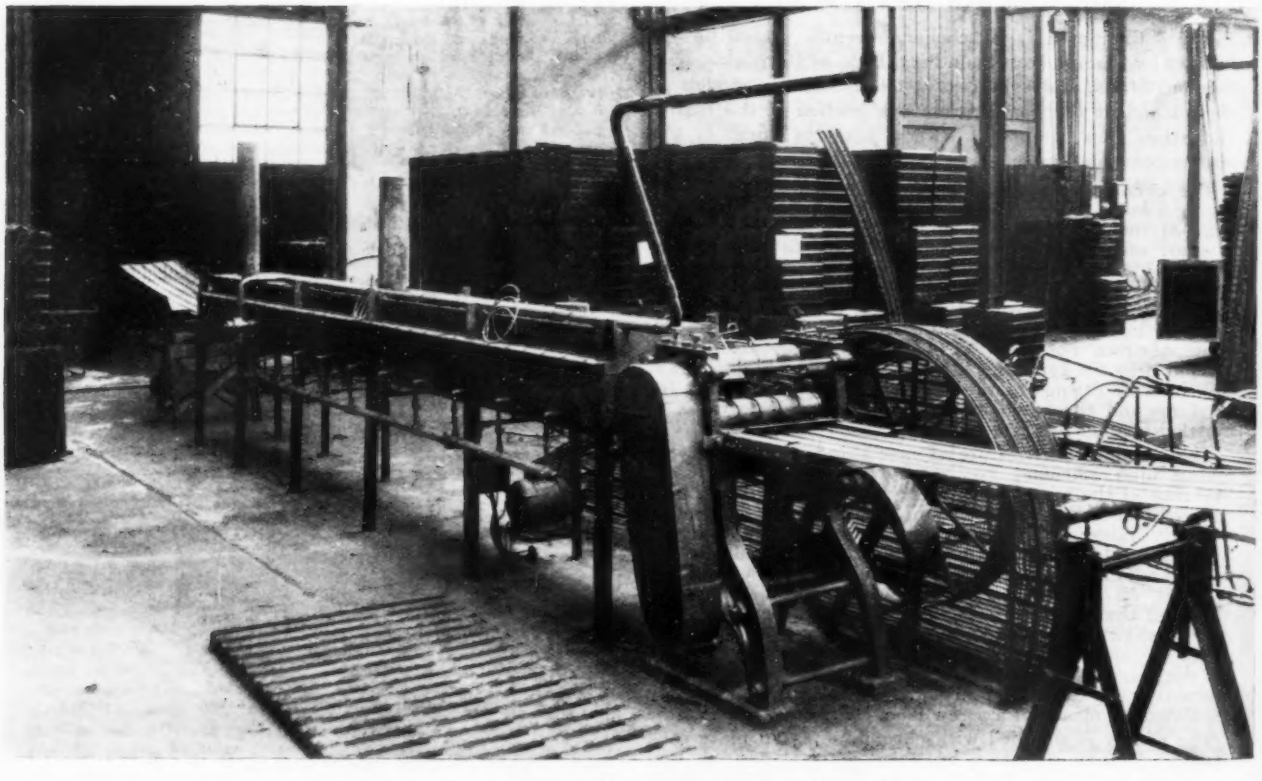
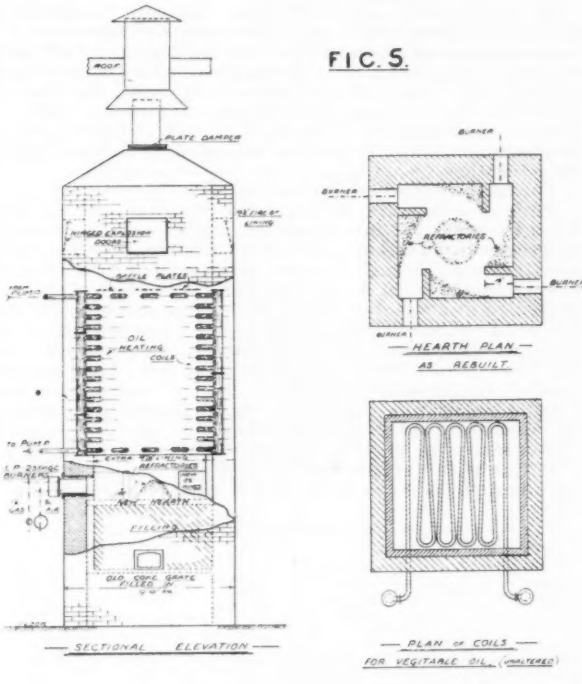


Plate 4.—*Continuous Drying Oven for "Hy-rib" Sheets.*

sumption per ton of forging heated. The actual position is, however, that the amount of work done by 10 to 12 tons of coal is now heated by 137,000 c.ft. of gas. This quantity is consumed per working week of 52½ hours (five working days).

"The users of the furnace have proved the following advantages: (1) Because of the direct application of gas into the furnace hearth the time required for heating-up the furnace to working temperature has been reduced by 1½ to 2 hours, thus giving a saving of 7½ to 10 hours per week on labour lighting-up charges. (2) Furnace repairs and renewals are reduced by one-half, the gas-fired furnace having no firebox or firebars requiring replacing or renewing. (3) The gas furnace occupies exactly one-half the space occupied by the coal-fired furnace displaced. (4) No labour charges are made against the furnace for the delivery of fuel or the removal of ashes. (5) Labour charges for furnace firing are now non-existent as such. The same number of men are still employed, but they are all employed on productive work. The greater time now available for the hammer has already given indications of better work. Heats 4 ft. 6 in. in length by 12 in. by 9 in. have been handled in batches of two at a time with success, also it has been possible to heat-up the furnace to 1280° C., thus giving enough heat to spot-weld the mild-steel handling bars usually attached to heats of this magnitude."

FIG. 5.



CONVERSION OF COKE FIRED VEGETABLE OIL HEATER TO GAS FIRING

Conversion of Coke-Fired Vegetable Oil Heater to Gas.

An interesting conversion of a large coke-fired vegetable oil heater has recently been carried out at Stretford. In this plant (see fig. 5) which is used in the manufacture of lards and margarines, oil is circulated intermittently from insulated vessels containing 5 tons of oil through a steel coil heater contained in a brickwork heating chamber. Heating was originally effected by coke firing with a forced draught furnace 7 ft. below the coils. The original cycle proposed was for a 5 ton batch of oil to be heated from 90° C. to 200° C. in a period of 40 minutes, the complete cycle to be 60 minutes allowing 10 minutes for emptying and filling the system.

Several schemes of gaseous heating were considered, and it was decided to install sixteen atmospheric burners of the bunsen type with secondary air drawn through the annular spaces in the burner ducts under the furnace. It was found in operation that there was insufficient control over the admission of secondary air, and under the most favourable conditions the maximum CO_2 figure in the products of combustion was 6·4%, equivalent to 73% excess air.

The results of the tests with these burners given below show that the temperature drop in the furnace gases was only 240° C., due to the rapid travel of the gases consequent upon the draught conditions that were necessary to induce a sufficient supply of secondary air.

The management of the factory were not satisfied with the results, and, in addition, intimated that they were anxious to complete the cycle of heating, re-filling, and emptying in 40 minutes. It was therefore decided to substitute automatic air-gas proportioning burners firing on to a broken refractory bed upon the hearth in order to secure maximum advantage of radiant heat transmission with a minimum volume of products.

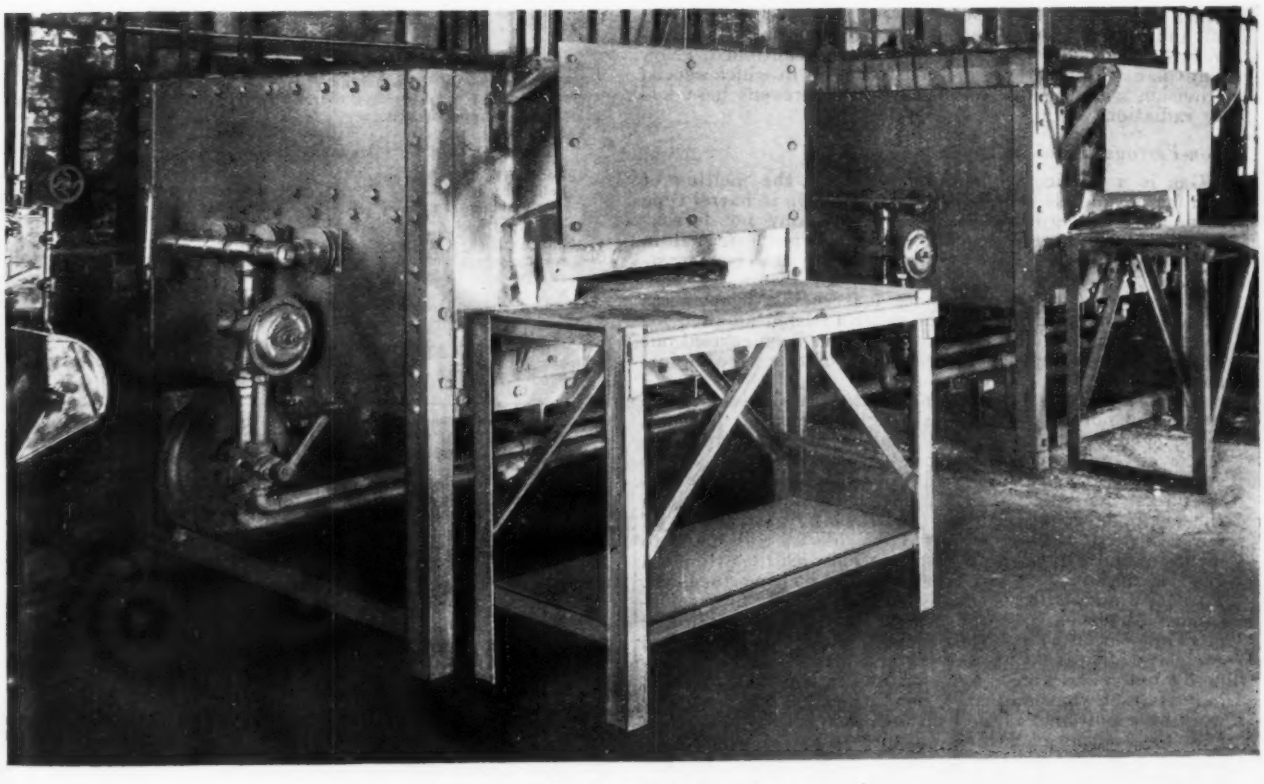


PLATE 5.—*Gas-Fired Forging Furnaces.*

There are 4 burners (the arrangement of which is shown on fig. 5) operating with an air pressure of ½ lb. per sq. in., and gas at town's pressure approximately 3 in. water gauge.

The results of the tests with these burners as given below show that the refractory hearth is maintained, during heating, at a temperature of 1000° C. with a gas consumption of 6000 c.ft. per hour, and a CO_2 concentration figure of 11·0% is maintained in the waste gases. The *modus operandi* is as follows: The storage vessel is filled with a charge of 5 tons of oil at a temperature of 90° C. The oil is then circulated through the heating unit until the temperature reaches 200° C.; the system is then discharged and a fresh charge of 5 tons at a temperature of 90° C. is introduced. The present period of heating is about 35 minutes, including 7 to 8 minutes for filling. The gas burners are shut off during the emptying period—7 to 8 minutes—and opened up immediately filling is commenced; circulation commencing at the same time as filling.

Over a period of a month's working of 120 hours per week an average gas consumption of 3300 c.ft. per charge or 660 c.ft. per ton of oil has been obtained.

This conversion illustrates the importance of selecting the most suitable method of firing and the particular advantages which gas possesses over other fuels in that its application can be varied to suit any required conditions. In this particular case the travel of the gases through the coils is short, and the original method of gas-firing giving a large volume of gases at a comparatively low temperature proved to be rather inefficient. The later conversion, however, gives ideal conditions of controlled combustion with the minimum of products and a high heat potential. It has resulted in an increase of efficiency from 56·0% to 67·3%, in addition to a saving of time of from 12 to 13 minutes per charge.

The following table showing the working results obtained under the two systems of firing are an indication of the improvement effected:

—	Atmospheric Burners.	Air Pressure Burners.
Average consumption per 5-ton charge	4000 c.ft.	3300 c.ft.
Combustion chamber temperature	600° C.	1000° C.
Waste gas temperature	360° C.	220° C.
CO_2 in waste gases	6·4%	11·0%
Average chamber wall temperature	40° C.	80° C.
Average time cycle	50 mins.	38 mins.

At present heat loss is being experienced, due to the lack of insulation of the brickwork chamber, which is estimated to be at least 5% of the total heat.

Another disadvantage is the loss of efficiency due to occasional hold-ups between charges. During these periods, which vary from 10 to 90 minutes, the burners are shut off and the refractory loses its heat potential which has to be regained before efficient working is continued. New plant is at present receiving consideration in which special provision will be made for insulation to prevent heat loss by radiation.

Non-Ferrous Metal Melting.

Gas is a particularly suitable fuel for the melting of non-ferrous metals whether by direct heating in barrel type furnaces or in crucible furnaces. In many non-ferrous foundries, melting in crucibles is considered essential in order to secure the best metal condition, and good castings.

The gas-fired pit type furnace for crucible heating, as usually constructed, follows the general design adopted for solid fuels and oil. Exhaustive tests have been carried out at Stretford to improve the efficiency of this type of furnace.

The original tests were conducted in a single crucible furnace of normal design consisting of a circular firebrick pit backed by insulation and fired by means of an automatic air-gas proportioning burner utilizing low pressure gas, and air at a pressure of 1 lb. per square inch.

The gas consumption of this furnace was high, being in the neighbourhood of 9 c.ft. (500 B.Th.U. gas) per lb. of metal melted. It is perhaps advisable at this point to mention a note of warning in connection with the estimated gas consumptions of non-ferrous metal melting furnaces. Furnace manufacturers usually give the estimated gas consumption of their crucible furnaces in terms of cubic feet of gas per lb. of yellow brass melted, under test conditions, exclusive of heating up periods and losses arising in normal foundry working. Such an estimate gives but little indication of what may be expected from the furnace under working conditions, as the consumer is generally concerned with the melting of various mixtures, some of which may contain a high proportion of copper, in which case the gas consumption figures obtainable when melting common brass are no indication of working results with other mixtures.

In the course of the experiments, it has been found that the size of crucible has an appreciable effect on the gas consumption, smaller crucibles being more efficient than the larger sizes, doubtless due to the fact that the heat has less distance to travel to the centre of the crucible.

All sizes of single chamber crucible furnaces have, however, one inherent disadvantage, the annular space round the crucible is of necessity small to keep the hot gases in intimate contact with the crucible, and as they therefore travel through the chamber at a high velocity, only a limited proportion of the available heat is usefully employed, the remainder being wasted in what is popularly known as "warming the parish."

It is clear that higher efficiency can only be obtained by recuperation, and a special furnace was therefore designed consisting of two 80 lb. crucible furnaces built side by side in one casing, each being provided with an air-gas proportioning burner firing tangentially round the base of the crucibles. A flue to atmosphere, provided with a damper, is connected to the base of each chamber, and a recuperative flue built near the top connects the two chambers together.

The method of working is as follows:

Both chambers are charged with crucibles, and the left hand burner is put into operation, the flue to the chimney being closed. The hot gases swirl round the crucible, rise, and passing through the recuperative flue, preheat the charge in the right hand chamber from which they are vented to atmosphere. When the charge is melted in the left hand crucible it is discharged, and a new pot placed in position. The action of the furnace is now reversed, the left hand burner being shut off and the right hand burner lighted, the preheat chamber of the last charge now becoming the heating chamber. Alternatively, in practice, in order to avoid damper working, one chamber is used continuously for melting and the other for preheating. This type of furnace showed a considerable reduction in gas consumption, as is shown by the following test comparison.

Test on Single 70 Lb. Crucible Furnace.

Charge No.	Metal.	Weight of Metal Charged. Lbs.	Time of Heat. Minutes.	Gas Used. C.Ft.	C.Ft. of 500 B.Th.U. Gas per Lb. of Metal.
1	Gun metal	70	83	800	11·40
2	,, ,,	70	68	570	8·10
3	,, ,,	70	79	580	8·30
4	,, ,,	70	56	510	7·30
5	,, ,,	70	72	690	9·80
6	,, ,,	70	51	500	7·10
7	,, ,,	70	51	483	6·90
8	Yellow brass	70	49	480	6·86
9	Nickel	70	45	467	6·67
10	Nickel alloy	70	70	604	8·60
11	,, ,,	70	45	470	6·70
12	,, ,,	70	40	370	5·30

Average consumption for day's run in cubic feet of 500 B.Th.U. gas per lb. of various metals (including first charge) = 7·7.

On a similar type of furnace, the following figures were obtained over a period of 12 months' working:—

CHARGE.—74 lbs. of metal. Average life of pots, 40-47 melts.

METAL MELTED.

Bell metal, 383 cwt.	White metal, 114 cwt.
Yellow brass, 368 cwt.	Nickel, 769 cwt.
Gun metal, 2011 cwt.	Other metal, 9 cwt.

Total metal melted, 3654 cwt. or 409,300 lbs.

Total gas used, 3,537,600 c.ft., or 17,688 therms.

Gas consumption per lb. of metal over year's run, 8·65 c.ft. of 500 B.Th.U. gas.

Test on Twin Chamber Recuperative Furnace.

Charge No.	Metal.	Weight of Metal Charged. Lbs.	Time of Heat. Minutes.	Gas Used C.Ft.	C.Ft. of 500 B.Th.U. Gas per Lb. of Metal.
1	Yellow brass	80	48	840	10·50
2	Gun metal	80	30	500	6·25
3	Yellow brass	80	22	360	4·25
4	Shaft metal	80	36	590	7·37
5	,, ,,	80	19	310	3·87
6	Yellow brass	80	34	550	6·87
7	,, ,,	80	20	330	4·12
8	Shaft metal	80	30	380	4·75
9	Gun metal	80	28	520	6·50
10	,, ,,	80	30	400	5·00
11	Shaft metal	80	26	500	6·25
12	,, ,,	80	36	470	5·87

Average consumption for day's run in c ft. of 500 B.Th U. gas per lb. of various metals (including gas used for first charge) = 5·998 c.ft.

Analysis of Flue Gases.

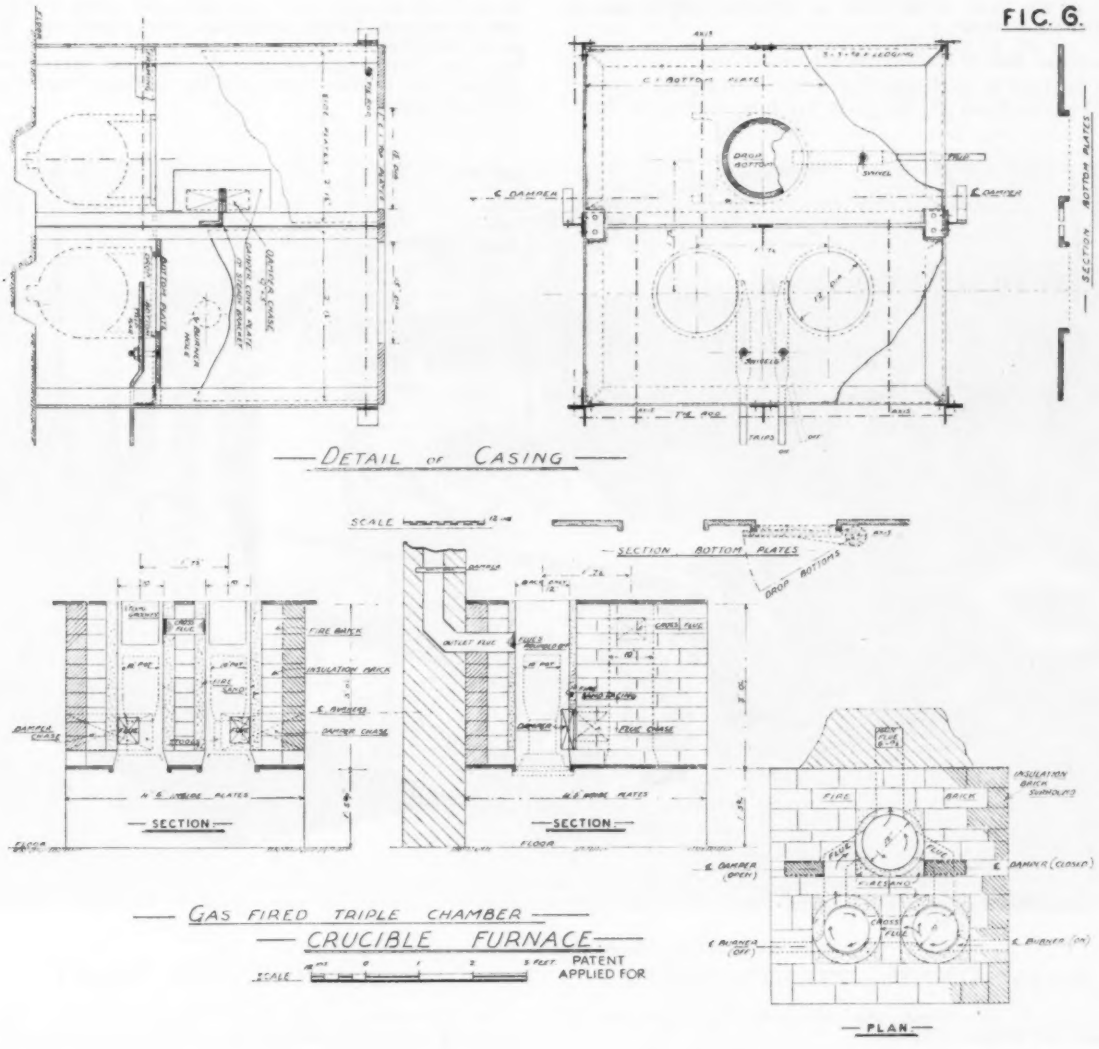
	%
CO_2	9·0
O_2	1·7
CO	0
N_2	89·3 – 100·0 %

Average temperature of gases vented from preheat chamber—500° C.

Owing to the success of the recuperative twin chamber furnace it has been decided to install a three-chamber furnace of the type shown in fig. 6, and this is now in course of construction. It will be seen that it consists of two pits, each of which in turn is the heating chamber, and a third permanent preheat chamber from which the gases are vented. The products of combustion pass through the three chambers in turn, preheating two charges, the direction of travel being reversed after each melt. One of the drawbacks of the twin chamber furnace is, that owing to the difficulty of sealing the dampers a small quantity of the products of combustion from the heating chamber are short-circuited to the flue without passing through the preheat chamber.

In the three-hole furnace this disadvantage is obviated; should any leakage occur at the dampers the gases will still preheat the third crucible before passing to the flue.

FIG. 6.



Several refractories have been tested for use as dampers, and it has been decided to use a sillimanite tile bound with a heat-resisting steel strap.

It is anticipated that the gas consumption in this new furnace under foundry working conditions will not exceed an average figure of from 4½-5 c.ft. per lb. of metal melted over a day's run, inclusive of heating up from cold.

Bright Wire Annealing Furnace.

A large bright wire annealing furnace which has recently been converted to town's gas firing is illustrated on plate 6. This furnace is of the water-sealed muffle type and is designed to deal with 1 ton of copper wire per hour in the form of coils. Originally fired by a " built-in " producer, this plant has been reconstructed for town's gas firing, and is complete with automatic temperature control gear. It is regretted that no gas consumption figures are yet available, owing to the short period in which the furnace has been in operation.

Melting and Heating of Inflammable Semi-solids, Bitumen, Pitch, &c.

Gas is particularly suitable as a fuel for the melting and heating of bituminous substances because of the accuracy and ease of control of temperatures.

In the Stretford Undertaking two independent schemes are in progress—one for the melting of bitumen and the other for the melting and heating of a bitumen compound—for serving of braided cables. The latter case is particularly interesting in that it was first proposed to use an indirect heating system for melting and maintaining a bitumen mixture in a large " D " shaped tank 4 ft. 4 in. wide by 8 ft. 6 in. long by 10 ft. deep. In this tank is fitted a revolving framework on which are mounted four drums at opposite corners. The process provides for the winding of one drum with cable whilst the next drum is being unwound, the two drums at the opposite corners being immersed in the compound whilst the feeding and discharging of the cable is practically continuous. The bitumen mixture in the tank is maintained at a temperature of 350° F., and if heated beyond this temperature coking is liable to occur at the point of heat application. It has been decided that the most suitable method of heating will be by burners giving a large volume of products at a relatively low temperature to be circulated through a series of flues, travelling first up the " D " shaped sides and down a part of the circumference to discharge at two flue outlets on either side. To enable this to be done a tank is built within a tank, the flues being formed in the annular space external to the inner tank.

It is considered necessary, in order to obtain the most efficient combustion when using this equipment, that the secondary air should be under control, and, therefore, a

special set of burner equipment has been designed by the burner makers in which air at 1 lb per sq. in. pressure is delivered to an automatic proportioning inspirator (as earlier described under Automatic Air Gas Burners) which draws in the requisite amount of gas. In this particular case, however, partial aeration only takes place, and a secondary supply of air is taken from the main high-pressure supply, and is used for inducing a supply of secondary air, which is distributed along the line of the burners by secondary air pipes. The automatic control is effected on the main air supply, a reduction in the pressure of which automatically reduces both the primary gas and air mixture, and the quantity of secondary air, still retaining the correct ratio of air and gas.

The actual burners consist of two tubes each carrying a number of special burner tips. Running parallel with these tubes are three secondary air pipes carrying jets, set at such an angle as to complete the aeration of the burner flames. In order to ensure that there shall be no " hot spot " at the base of the tank, a refractory tile is placed above the burners.

Control and Safety Arrangements.

The heating is controlled by a thermostat, operating a control valve fixed in the main air line, which, in turn, as previously described, controls both the admission of gas and air to the burners.

A permanent by-pass is arranged so that the thermostat at no time completely extinguishes the burners, and, in addition, a special cut-off valve ensures that the gas is instantly shut off in the event of failure of the main air supply.

Provision is also made for an atmospheric burner for maintenance purposes over the week-ends and shut-down periods, the secondary air being supplied in this case by the opening of doors in the base of the heating jacket. The tank is to be thoroughly insulated, being built into a pit, the top of the tank being at a convenient height above floor line.

It is anticipated that the overall efficiency of this plant will be approximately 60%.

The writer has not mentioned the use of gas for steam raising. It is, however, of particular interest that one large factory in the Stretford area, where the load is intermittent, has at present under consideration a scheme for discarding Lancashire boilers in favour of gas-fired steam boilers on account of the great savings which will be effected by synchronizing the fuel consumption with the steam demand.

It should also be mentioned that there is great scope for extending the use of gas for power purposes, and even in the generation of electricity.

In recent years very little work has been done in improving the design and efficiency of town's gas engines, and it is gratifying news to learn that a well-known firm engaged in the manufacture of gas engines is at present carrying out research to improve the efficiency of the town's gas engine, and they report having completed two horizontal 4-cylinder town's gas engines, each of 250 B.H.P., in which the average gas consumption on full load is 20·2 c.ft. per B.H.P., with gas of a net calorific value of, approximately, 400 B.Th.U. per c.ft. Moreover, it is reasonable to assume that the development of the use of gas for motor vehicles will eventually lead to the production of a more efficient town's gas engine as has been the case with petrol and Diesel engines.

The figures of tests throughout this paper are all taken under factory working conditions, and being subject to the normal delays and wastage consequent upon variation of time in normal factory working, they should not be compared with figures obtained in the test room or laboratory. They are, however, of particular interest as representing comparative results under similar working conditions for different fuels.

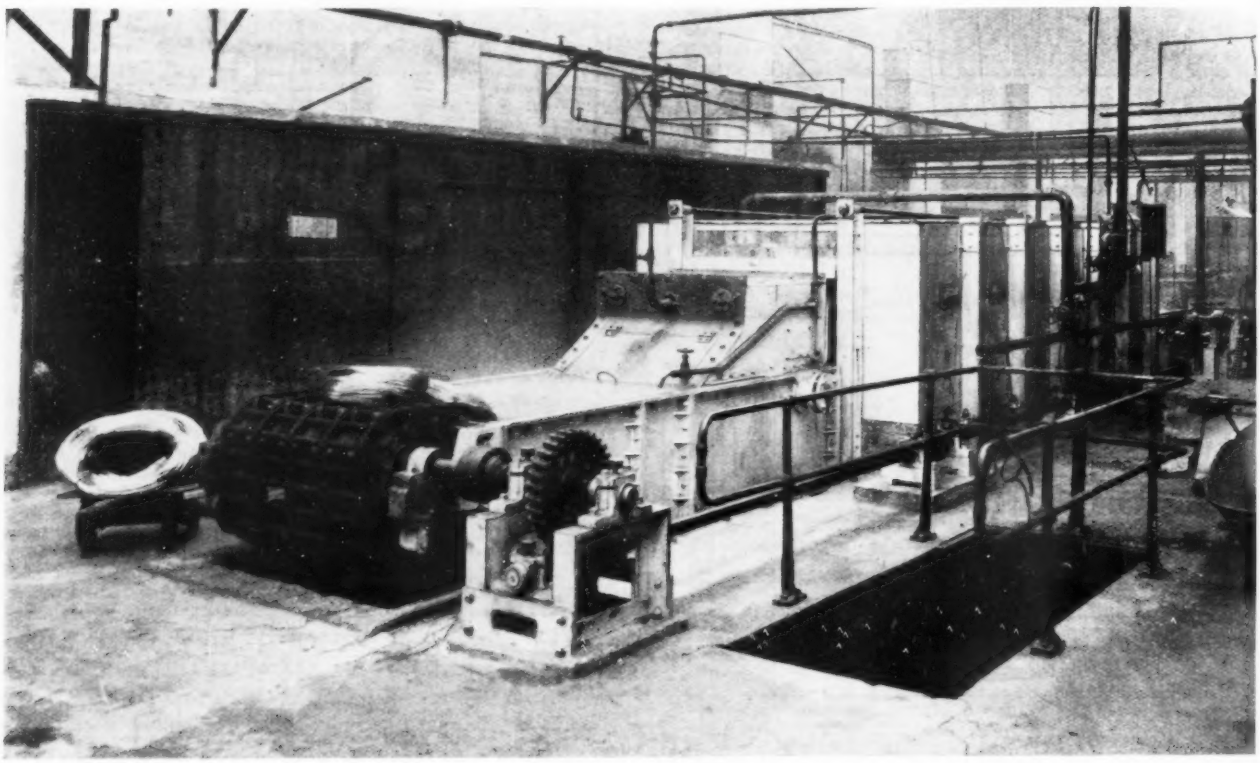


PLATE 6.—*Gas-Fired Bright Wire Annealing Furnace.*

In conclusion, I feel that I have not been able to do more than touch upon the fringe of the subject, and I have found the task of bringing the " Industrial Use of Gas " within the ambit of one communication beyond my powers. I trust, however, that the description of some small work achieved in the industrial field will be of service to my co-workers in the Industry.

I should like to acknowledge the valuable assistance rendered by the Stretford and District Gas Board's Technical Gas Salesmen, Messrs. G. H. F. Windiate and W. L. Howe, in the preparation of this paper.

Discussion.

Mr. A. W. SMITH (Birmingham), in proposing a vote of thanks to Col. Carr, said the subject which he had dealt with was a vast one which could not be covered in all its ramifications in one paper. In their contact with Col. Carr at Stretford they appreciated the courage and enthusiasm he had shown in the development of his own industrial sales, and they knew he was backing it up with the service which he had mentioned. He agreed that service was one of the essential parts of the selling of gas. The paper had confirmed the view, which was impressed on him in London the previous week, that they could not deal with these matters by correspondence such as was at-

tempted in many cases. In nearly every case it meant a definite investigation on the spot, in the presence of the manufacturer. That, of course, emphasized the importance of setting up the Development Centres which the Gas Industry had decided was to be their next move. They all had on their doorstep a field for the industrial use of gas. Some years ago the manager of an undertaking in a more or less country district said it was no use saying he had a field for the industrial use of gas. Dr. Walter made a bet that he could find an avenue there, and on going down he discovered there was a big dairyman who sent his milk churns away to be repaired. An investigation was made with the result that a number of tinsmiths' sets were installed, and now the man was doing his own repairs, and, he believed, making his own churns, thus giving a good load to the local gas undertaking. While they claimed naturally all they could do for the efficiency of gas and its elasticity in use, it was essential they should have a scientific investigation of their costing and be prepared to cut down the price if it was possible to do so.

Mr. J. T. HAYNES (Rotherham), in seconding, said the paper impressed him as being written by a man who investigated thoroughly all the factors relating to gas and then made up his mind very definitely as to the line of action he intended to take. He congratulated Col. Carr not only on the way in which he had put forward his facts, but on the line of action he had taken in introducing the industrial application of gas at Stretford. He had put forward a number of facts which were useful as a basis of calculation for those of them who had to meet similar competition. As the result of some experiments they made in Rotherham recently with a converted furnace it was indicated that by increasing the gas consumption by 30% they increased the output from the furnace by 50%. The result was that the whole of the crew who were on piece work drew higher wages, and not only was the manufacturer satisfied but the workmen were enthusiastic and asked that more furnaces should be put on to gas.

In their effort to popularize gas they had to compete against oil, and in that connection he thought the recently authorized Liaison Committee might consider the question of a national price for gas in the same way that the oil industry had practically a national price. No hard and fast rule could be made as to the price of gas; that must be determined by a thorough investigation of the particular furnace and requirements. They had heard that by the operation of the Coal Mines Act colliery undertakings were able to charge for coal more or less in accordance with its destination rather than its cost, to the detriment of the Gas Industry. He suggested that they should not charge in accordance with the destination of gas regardless of the cost. He stressed the advantage of having a large number of smaller consumers at different points of their distribution system, and he believed that by properly graded service charges they could enable all consumers to have gas at a low price, which would induce them to use it more liberally than at present.

Dr. C. M. WALTER (Birmingham) said he had seen many of the installations referred to, and it was wonderful to go round some of the works and find that town gas was replacing fuel oil even at a very low cost. He thought they must not forget the importance of dealing with the question of cost from the all-in cost point of view. They had on many occasions heard of the B.Th.U. cost of gas compared with the B.Th.U. cost of other fuels, and in the majority of cases that was not, in any way, a true comparison of the actual total costs. He would like to quote an actual case which came to his notice some time ago. They had to consider the question of displacing producer gas with town gas, even at a considerably higher B.Th.U. cost at the producer itself. In this case the cost of producer gas was approximately 2½d. per therm. They were surprised to find by the time the fuel got to the actual steel in the furnace that the cost was 2s. 9d. per therm, which was due to the loss between the producer and the hardening shop and to the fact that at certain times the furnaces had to run without load. That was only one instance which showed, without question, how important it was to take the all-in cost to the point of usage rather than to compare fuel on the B.Th.U. basis only. Dr. Walter emphasized the necessity of making a complete survey of the whole of the operations to be performed to be quite sure they were giving the consumer the most efficient type of burner or furnace, and he also urged the importance of giving a supply of fuel of constant quality which he felt was more important than calorific value. In regard to purging, he said the effect was to set up a circulation of products in the chamber; this considerably increased the rate of heat input, and the actual gas consumption of the purging burners was more than compensated for by the heat transfer brought about by circulation. They often found that electric furnace results were quoted at 100%, but it was reasonable, especially where there was a fair amount of door opening, to regard it as 85%. If they took current at ½d. per unit and allowed an efficiency of 85% the cost of heat energy would amount to about 1s. 6d. per therm. With a modern gas furnace operating at 50%—they could obtain as high as 65%—and at 4d. a therm they could calculate the operation at the rate of 8d. per therm of heat put into the work. With regard to service, he thought they could take it that service in connection with industrial development work was a *sine qua non*. Before they started developing industrial applications they had first to form their service department and work from that end.

Mr. W. DIETERICHS (Gas Light and Coke Company) said they were all looking for new babies and not watching with the care they might the apparatus they had already got. He thought the time had come when they would have to co-operate a little more with the manufacturers of furnaces and apparatus using heat. At present there must be hundreds of manufacturers providing different types of machine which required heat, and he was sure there was a tendency for them to think electrically when there was no reason for it at all.

Mr. C. H. CARDER (late Chief Gas Engineer, Rio de Janeiro) said he was impressed by the point that they had avenues of consumption at their door. In Rio de Janeiro, which was largely administrative and commercial, they looked round and found an enormous field for both commercial and industrial application. Between Rio and Sao Paulo at the end of last year 1400 purely industrial consumers took over 9 million c.ft. per month, and, in addition, approximately 4500 commercial consumers took 26 million c.ft. per month.

Col. CARR, in reply, agreed that investigation on the spot was of vital importance; while industrial gas centres could help, yet they must not make the fatal mistake of resting on their oars and leaving to some outside organization the work which they should each do individually. It would be a fatal mistake if they got the idea that some national body was going to be set up which was going to take from each or any of them the responsibility of developing the industrial load in their own areas. They must set up their own machinery. The national organization would only be something to which they could look to assist them in difficulties which were beyond the scope of the machinery which they themselves had set up.

Alderman J. H. LLOYD proposed a cordial vote of thanks to the Chairman for presiding, and expressed the hope that districts would do something for each other and for the proper development of the Gas Industry.

Legal Intelligence.

Low-Temperature Carbonisation, Ltd., *v.* Samuel Barlow Coal Company, Ltd.

On Friday, Feb. 24, the plaintiffs in this action were granted an injunction against the defendants for passing off low-grade fuel under the plaintiffs' mark.

Mr. J. B. LINDON (Counsel for the plaintiffs), in moving for the injunction, explained that the plaintiffs were applying for an injunction to restrain the defendants from selling or offering for sale as "Coalite" smokeless fuel not of the plaintiffs' manufacture, and from passing off smokeless fuel not of the plaintiffs' manufacture as that of the plaintiffs, and from infringement of the plaintiffs' registered trade marks. Counsel stated that it had been ascertained that the defendants had been selling a low-grade fuel under the name of "Coalite," and in response to orders which were sent to them supplied a grade of fuel not manufactured by the plaintiffs.

The defendants, in consenting to an Order through their Counsel, stated that it was a mistake that the muddle arose, and that the Directors of the defendant Company knew nothing about it.

His LORDSHIP granted a perpetual injunction in the terms of the Notice of Motion, and ordered the defendants to pay the plaintiffs' costs.

Parliamentary Intelligence.

[From Our Special Correspondents.]

House of Lords.

Private Bills.

The following Lords have been appointed a Select Committee for the consideration of the South Suburban Gas Bill: The Marquess of Bristol (Chairman), the Earl of Effingham, Lord Mendip, Lord Foxford, Lord Cozens-Hardy.

Special Orders.

The Order appointing a Select Committee on the Watford and St. Albans Gas Order, 1932, has been discharged.

House of Commons.

Special Orders.

Plans have been deposited in connection with the Burnham-on-Sea and Chester Gas Orders.

The Wandsworth and District Gas Company

ORDINARY GENERAL MEETING

The Ordinary General Meeting of the Company was held at the Chief Office, Fairfield Street, Wandsworth, London, S.W. 18, on Tuesday, Feb. 28—Mr. FRANK H. JONES (Chairman and Managing Director) presiding.

The SECRETARY (Mr. W. H. Cromarty) read the notice convening the meeting and the Auditors' certificate to the accounts.

The Directors' Report and Accounts for the year ended Dec. 31, 1932, were taken as read.

CHAIRMAN'S ADDRESS.

The CHAIRMAN, before proposing the approval and adoption of the Report and Accounts, expressed the general feeling of grief at the death of Mr. Robert Garraway Rice, who had become Deputy-Chairman of the Company on amalgamation with the Mitcham and Wimbledon Company in 1913. He had joined the Board of the old Mitcham Company in 1891, and had become its Chairman in 1905. His death occurred on Jan. 10 last. The Board and the employees of the Company felt deeply the loss of his valuable service and experience, and the Chairman was sure that the shareholders shared their regret.

Just prior to the Meeting the Board had tentatively elected Dr. T. A. Ives Howell (late Deputy-Chairman of the Wandsworth and Putney Company) to the position of Deputy-Chairman of the Company. In 1913 Dr. Howell had very generously given up his position as Deputy-Chairman, at the request of the late Chairman of the Wandsworth Company, in order that Mr. Garraway Rice (who had been Chairman of the Mitcham Company before amalgamation) should become Deputy-Chairman. The Chairman said that, having known Dr. Howell for many years, he was naturally delighted to know that he would have the support of an old colleague as Deputy-Chairman.

Commenting upon the fact that the meeting was held at Wandsworth, in accordance with the hope expressed last year, the Chairman said that it was the largest meeting of shareholders that he had addressed, or had seen addressed by a Chairman of the Company, since he had been connected with it—a period of about 25 years. The actual building in which the meeting was held was one of the original retort houses of the Company, the original walls remaining intact, so that the cost of reconstruction was nothing like so great as might be imagined. The whole of the staff were able to work in comfortable and healthy surroundings. With the help of Dr. Mosely, who was the Company's full-time Medical Officer, the aim was to ensure that everyone working for the Company entered its service a healthy person and enjoyed surroundings conducive to health and cheerfulness. Dr. Mosely had an office and surgery at headquarters, and a depôt at each of the Company's stations. All who entered the service of the Company were medically examined, and there were healthy surroundings and provisions for sports. Further, Co-Partnership and the contributory Pension Fund provided for the later days of those who stayed in the service of the Company, in addition to the provision made by the State. Co-Partnership was a real live force in the Company, and was a very large factor in enabling the Board to recommend the payment of a dividend of 7%. A sum of £26,444 had been allocated to the co-partners, of whom there were 1728, their total holding at the end of 1932 being £139,520 of the Company's Ordinary Stock. This holding had been further increased this year.

INCREASED GAS SALES.

In spite of trade depression and the especially mild weather experienced during last year, it was gratifying to be able to report an increase of 0·8% in the consumption of gas during the year. But for the fact that adjustments had had to be made in the dates of meter readings in order to bring into line the amalgamated companies, a still greater increase would have been shown. For many years past there had been an increase in the sale of gas annually, and 1933 to date showed an increase of 4·41% over the corresponding period of last year. During the past year 6292 additional consumers had been obtained by the Company, and nearly 15,000 extra appliances had been supplied. The total number of consumers was 154,000. In the past year the Company's mains had been extended by 24 miles of new mains and 8 miles of duplicate mains. The high-pressure main which was laid some four years ago from the Company's Wandsworth Works to Mitcham and thence to Worcester Park had become increasingly useful and had substantially assisted in maintaining adequate pressures in districts in which otherwise it would have been necessary to provide trunk mains, at a large capital outlay. During the night hours, when this main was not in use for increasing local pressures, it was of the utmost utility in conveying gas from the Wandsworth works direct into holders at the other stations of the Company.

The Company's showrooms numbered fourteen, which number included a travelling showroom; and nearly all were the freehold property of the Company. The importance of this branch of the business could be readily appreciated when it was known that over 424,000 callers, mostly being consumers and potential consumers, had entered these showrooms during the past year. A new showroom opened in Mitcham during the year was proving a great service to the consumers in that area.

Sales of apparatus during the period under review had been a record in the history of the Company, and the fact that consumers could pay their accounts and make a local gas office of the showroom was obviously appreciated. The Company did not ordinarily send out collectors, but gave consumers the option of paying by cheque or at any of the showrooms of the Company, and the cost of collection was very low as compared with those of many other companies.

COMPETITION FROM OIL.

Competition was a point which received the closest attention of the Board, and in spite of the political boost given to electricity and the absurd folly of allowing imported oil to compete with coal (the only real natural asset this country had) and its products as treated in a gas-works, the Company was still able to progress and convince the residents in its area of supply that gas provided the cheapest, most efficient, safest, and healthiest form of cooking, heating, and lighting, and was without rival as regards many industrial operations requiring heat. Oil was a very serious competitor, and he could visualize cheap untaxed oil being dumped into this country and becoming a greater menace to the Company under certain conditions than any electrical undertaking. There was competition from oil which was sold from the Thames at a ridiculous price, and it was becoming a serious competitor for certain large units of heating.

Gas-consuming apparatus of far more attractive appearance than heretofore was now available from which consumers could select, and arrangements had been made, and were now in operation, for the latest types of cookers and fires to be available on hire to consumers.

Arrangements had also been made whereby those consumers who obtained their gas by means of prepayment meters could have better finished cookers than those previously supplied. The additional cost incurred by the Company was recovered by a small deduction from the rebate at the time of collection of the money from the coin boxes. It should be appreciated, however, that modern apparatus, with its improved efficiency, had had the effect of reducing the consumption per particular operation, but this proved good business in the end, as a consumer, realizing that he was obtaining economical apparatus and efficient service, found he could afford to install additional appliances. An important development in this branch of the Company's business had been the ability to colour any apparatus to suit consumers' requirements at a very small additional cost, and a colour treatment shop was now completed at the Mitcham Works and would be put into operation shortly. This had proved a very popular service.

AN ECONOMIC GAS-MAKING POLICY.

It was the definite policy of the Company to make a predetermined amount of gas at the smaller stations, the amount being that which could be most economically produced according to the size of the station; any increase in demand by reason of seasonal or climatic conditions was produced at Wandsworth and transferred by various trunk mains direct on to the district, or into the holders at the other stations. This policy was proving an economy in the cost of working and would be reflected in a considerable degree in the balance-sheets of the future. The works at Wandsworth were probably the most economical gas producing works in London, and it was the Company's policy to make as much gas as it could there and to distribute it to outlying holders, so that less gas would be made at the outlying works.

Considerable alterations and improvements had been carried out or commenced at the Wandsworth Works during the past year, the most important being the re-building of the river wall. The old wall had become unsafe for the modern conditions of unloading, requiring, as it did, the use of heavy cranes on the river front, and alternatively a large sum would have had to be expended in repairing this wall, which even then could not have complied with the new flood level regulations wisely imposed by the London County Council to prevent any recurrence of the flood experienced in 1928. Therefore, the Company had applied for and had received the permission of the Port of London Authority to alter the line of the wall.

In the immediate future the construction of a pier would be commenced for the discharging of the Company's steamers out in the river by means of hydraulic cranes. This plant, when completed, would be of the most modern type and would discharge the Company's ships in a shorter time than at present; it should prove extremely economical, and also would prevent the double handling of coal, which had been a serious expense in the past. The new 4 million c.ft. capacity gasholder at Worcester Park had been completed and put into commission, and was already providing a means of economizing in the distribution of gas. It was put to work just before Christmas. He was sure everyone would be relieved to know that it was

not of the type which early this month was involved in the calamity in Germany. There were none of this type of holder in this Company.

During the next three months, it was anticipated, the Epsom Works will be closed down for the manufacture of gas, but they will be maintained so that they could be used in the future if and when necessary. The men affected by this operation would be absorbed into other branches of the Company as far as possible and would not suffer generally by the alteration.

A new steamer had been built during the year of Accounts and was launched on Sept. 28 last. The vessel had been named the "Wandle," and was the third of the Company's fleet to bear this name. The ship successfully completed her trials, which he had witnessed, and had arrived at Wandsworth on her maiden voyage on Oct. 30 with a cargo of 2215 tons of coal, thus creating a record, as no ship of this size or cargo capacity had hitherto passed under London Bridge. The new ship had been running extraordinarily well during the terrible storms and gales experienced recently, and one day she was the only ship to get in to time.

Capital Expenditure.

In perusing the accounts generally it would be realized that the outstanding item was the large increase of capital expenditure. It must be borne in mind that in an area such as the Company supplied, and where, he was glad to say, there was still a large amount of development taking place and large areas were likely to be built upon in the future, it was necessary to lay mains in roads during their construction in order to avoid the expense of reinstatement of the finished surface, this reinstatement being the most costly part of main laying at the present time. Again, works had to be built in advance of development. This sequence of events, therefore, incurred the expenditure of capital in anticipation of future demands.

The capital expenditure was an item which had the closest investigation and scrutiny of the Board before sanction was given for the work to be undertaken. The Board had a number of Committees, including a Technical Committee, a Property Committee, and a Finance Committee, and any expenditure proposed had to be considered by the appropriate Committees before it was sanctioned by the Board.

During the past year the Company had issued capital to the extent of £275,507, made up of £125,000 of 5% preference stock and £150,000 of 5% debenture stock. On the former issue a premium of £507 was received, which made up the total mentioned. The Chairman added jocularly that it was a matter of grief to the Board that Mr. Chamberlain had not intimated quietly that he was going to launch a conversion scheme when he did, so that the issue could have been made a little later, and then the Company could have obtained a premium of thousands of pounds.

The Revenue Account showed that the profit on the year's working amounted to £209,572, which compared with a figure of £202,967 for the previous year, to which had to be added the profit of the Sutton Undertaking for the first six months of that year. After making full provision for dividend interest and after charging part of the cost of Capital Duty, there would be a sum to carry forward of £41,817, as against £45,710 brought in, or a small deficit of £3893. Perhaps it might be suggested that the Company had not earned the dividend, but the Chairman emphasized that it did not declare a dividend until every provision was made for upkeep; a very heavy figure for depreciation was included in capital account. For several years lately the Company had drawn a little on its carry-forward, but the Reserve and Special Purposes Funds were kept intact, and, indeed, had been increased. It was hoped that, by means of various economies which were being effected, this deficit would not recur in next year's accounts, even allowing for no improvement in the present financial depression. He mentioned that 1932 was the first year in which the working of the late Sutton Undertaking had been fully incorporated with Wandsworth.

On the whole it might be considered that the year under review had been a satisfactory one, and he confidently looked forward to the future. On behalf of his colleagues on the Board and all Co-Partners, he said that no stone would be left unturned which could prove beneficial to the shareholders and consumers alike throughout the Company's areas.

During the year there had been a considerable re-arrangement of the duties of the Senior Staff. It gave rise, he was glad to say, to no necessity for going outside the staff to fill all positions, and he thanked personally all who had so loyally and whole-heartedly helped to carry out the changes, which were recognized to be of advantage to the Company.

The Chairman then moved the approval and adoption of the Report and Statement of Accounts.

Dr. T. A. Ives Howell (Deputy-Chairman) seconded.

Mr. J. Burgess (a Shareholder), referring to the Reserve Fund investment of £42,378, and the Special Purposes Fund investment of £67,008, as shown in the balance-sheet, asked in what securities those Funds were invested. He also asked what were the proportions of ordinary stock, preference stock, and debenture stock in the Company. He emphasized that the holders of debentures and preference stock had the first and second call, and that ordinary shareholders did not receive dividends until those debenture and preference stock holders had been paid. If the Company were over-burdened with preference stock and debentures, then he would say with all respect that the ordinary shares might represent a bad third, although he personally had every faith in the Company.

Mr. J. Young said that in the balance-sheet the figures for the Pension Fund was £180,572, *less* £153,022 invested. He asked where that £153,022 was.

The Chairman then gave particulars of the investments of the Reserves, Special Purposes, and Employers and Public Liability Insurance Funds to show that the whole of them were invested in English trustee securities.

The paid-up capital of the Company, he continued, was nearly £2,500,000, and there was over £1,250,000 of loan capital. With regard to the suggestion that the ordinary capital might be over-burdened, he pointed out that the ratio of loan capital to ordinary and preference capital was not fixed by the Board, but by Parliament. Years ago Parliament had said that gas companies should not raise more than one-third of the amount of the total capital as loan capital; then the proportion was increased to one-half, and it had since been increased to 60%. An ordinary shareholder should bear in mind that the Company could raise loan capital at certainly 1% per annum cheaper than ordinary capital.

Replying to Mr. Yonug's question with regard to the Pension Fund, he said that there was brought into the balance-sheet only £27,550, which was the difference between the total assets of the Fund (£180,572) and the amount invested (£153,022). The investments were made in the name of the Trustees, who were certain Directors and officials of the Company, and they were not brought into the Company's accounts from the trading point of view.

Mr. Young asked if that meant that the Company was not responsible for that money.

The Chairman replied that the Company was responsible to its officials and staff for a Pension Fund which it had started. Contributions were paid as to half by individual workers and half by the Company, and they were made weekly. As the Fund accumulated it was invested. The Company was responsible at the moment for the uninvested balance of £27,550 shown in the balance-sheet, and also for the solvency of the fund.

The Company's investments were worth a very great deal more than the figures shown in the accounts, which latter represented the cost to the Company.

The resolution for the adoption of the Report and Accounts was carried.

Dividends.

The Chairman proposed that dividends be declared for the six months ended Dec. 31, 1932, at £2 10s.% on the 5% preference stock and £3 10s.% on the consolidated stock, less income-tax, making the total dividends for the year 5% and 7% respectively.

Mr. G. F. Page (Chairman of the Finance Committee) seconded, and said he could do so with a very clear conscience. The accounts had been very carefully guarded, and the dividend had been earned thoroughly.

The resolution was carried.

Re-Election of Directors.

The Chairman proposed the re-election of Dr. T. A. Ives Howell, Mr. G. F. Page, and Mr. E. Sherrard, who had retired by rotation. He pointed out that these gentlemen were originally Directors of the Wandsworth, Mitcham, and Kingston Companies before the amalgamation.

The resolution was seconded by Mr. R. M. Chart and was carried.

Re-Election of Auditor.

On the motion of Mr. J. C. Potter, seconded by Mr. O. B. Green, the meeting re-elected Mr. Bernard Hennell, F.C.A., an Auditor of the Company.

Mr. Hennell briefly expressed his appreciation of this renewal of confidence in him.

EXTRAORDINARY GENERAL MEETING.

An Extraordinary General Meeting was then held in order to authorize the Directors to issue, as and when they thought fit, the share capital authorized by the Wandsworth and District Gas Order, 1931, and remaining unissued; and to borrow, on mortgage or by the issue of additional debenture stock of the Company, any sums not exceeding in the whole 60% of the amount of capital raised at the time of borrowing.

The necessary resolutions were proposed by the Chairman and seconded by Dr. T. A. Ives Howell (Deputy-Chairman).

Mr. J. Burgess said that if the Directors were going to raise 60% of the money by debentures, that left only one-third of the total to be raised by ordinary stock, even if no preference stock were issued. It seemed to him that if half were raised by debentures and preference stock it would be an abundance.

The Chairman pointed out that Parliament had decided the proportion of loan capital to total capital to be raised by gas companies. The Wandsworth Company had to spend a good deal of money on the district, and he asked whether the shareholders would prefer that the Company should raise money on 4% debentures at, say, 120 or 124, or should raise ordinary capital to be remunerated at 7% and for which it could only obtain 130, 135, or 140. The difference was, roughly, 1%. The dividends of the ordinary shareholders would be jeopardized more by the raising of ordinary capital than by raising the capital by loan.

The resolutions were then put to the meeting and were carried.

Votes of Thanks.

The Chairman, proposing a vote of thanks to the staff and employees, said that the total number of co-partners was 1728, but the total number of employees was greater than that, for

employees could not become co-partners until they had, as it were, served an apprenticeship and had proved themselves worthy. The Company was exceptionally fortunate in regard to its employees. It had a comparatively young staff, all of whom were very keen, and the balance-sheet provided evidence of their good work. The policy of the Company was to sell cheap gas, and it sold gas more cheaply than any of its big neighbours in London; it had done so for many years and meant to continue to do so. It was selling gas at nearly 1d. per therm below the price charged by the largest Company in the world, and it was very proud of the fact. The Company would not be in a position to charge its present low price and to pay 7% dividend on ordinary stock unless there were tremendous enthusiasm and driving power in the whole of the staff. If any post in the Company's service became vacant at any time, there was somebody in the Company's service ready to step into it. That had been the aim of the Board for some time.

The resolution was seconded by Mr. J. BERTRAM BROWN, and carried.

Mr. C. M. CROFT (Chief Engineer and General Manager), responding, said that probably there was never a time, bearing in mind the acute electrical competition, when the loyalty and enthusiasm of everyone connected with the Gas Industry was so vital as at present. That loyalty and enthusiasm permeated the whole staff and everything was done to encourage it. The staff knew all the Committees of the Board, each being specialized in its type, and insisted upon having only the very best, and the whole staff endeavoured always to exceed the best of any other companies.

Mr. SAMUEL BROWN proposed a hearty vote of thanks to the Chairman and his fellow Directors for their service to the Company, and incidentally expressed the shareholders' pleasure that the Chairman had recovered from his recent illness. The Company, he said, was one with which anybody might be proud to be connected.

Mr. J. YOUNG seconded. He thanked the Board for the opportunity which had been given to the shareholders to inspect the works that day and acknowledged the courtesy of the guides.

The resolution was carried.

The CHAIRMAN, in the course of his response, expressed pleasure that so many shareholders had attended the meeting, and said that the confidence displayed by the shareholders was most gratifying.

The meeting then closed.

Hornsey Gas Company

ANNUAL GENERAL MEETING—LOW PRICE OF GAS

The Annual Ordinary General Meeting of the proprietors was held at the Company's Offices, 5, Great Winchester Street, London, E.C., on Friday, March 3, 1933. Mr. A. M. PADDON, M.Inst.C.E. (Chairman of the Company), presided.

The GENERAL MANAGER AND SECRETARY (Mr. K. Leslie Mortimore, A.C.A.) read the notice convening the meeting.

The Directors' Report and Statement of Accounts for the year ended Dec. 31, 1932, were taken as read.

CHAIRMAN'S ADDRESS.

The CHAIRMAN, moving that the Report and Accounts be adopted and entered on the minutes, first referred to the very severe loss the Company had sustained by the death during the year of Mr. T. W. Seager Berry, who had served the Company as a Director for a period of eight years. Most of the proprietors were aware, he said, of the exceptional qualities which Mr. Seager Berry had brought to the service of the undertaking. He was a most prominent authority on private legislation—and private legislation loomed larger and larger day by day in the conduct of any statutory undertaking. There was a time when such things were referred to perhaps once in a year, or at intervals as the necessity arose, but a statutory undertaking to-day must watch its steps very carefully indeed in respect of its statutory obligations, and in that duty of vigilance and care the Hornsey Company had had an exceptional degree of assistance and guidance from Mr. Seager Berry. Quite apart from his talents and great experience, his amiability left an impression on the minds of his colleagues on the Board which could not be effaced.

As indicated in the Report, the Board had replaced Mr. Seager Berry, so far as it was practicable to do so, having regard to his special qualifications, by another gentleman who brought an exceptional contribution to the administration—Mr. J. W. Buckley, the Company's former Engineer and General Manager. It was not necessary to say very much about Mr. Buckley, because the whole of the Report and Statement of Accounts was more or less a record of his achievement as an executive officer. He had joined the Company 24 years ago, and as each year had passed he had left some impress of efficiency and skill in the interests of the undertaking. The Company could congratulate itself upon having preserved his counsel and assistance by his appointment as a Director.

CHEAP GAS.

Commenting on the fact that the sales of gas had been reduced by 4·8% during 1932 as compared with 1931, the Chairman said that that was a very general experience, but it had to be considered that this undertaking was not in a normal condition, by reason of the fact that its area of supply was circumscribed and limited and was not susceptible to further extension; practically the whole area of supply was built over, and any developments in the sales of gas must depend upon the efficacy and skill with which the further use of gas was recommended to existing consumers. Therefore, there was nothing alarming in the decreased output, associated as it was with the special circumstances of general trade and commercial depression. In 1933, to date, the situation had been rectified to some extent, for the output was slightly greater than that for the corresponding period of 1932; but the Company must look, in this detail as in all others, to the skill and efficiency of its executive officers and its methods of administration. One might ask in what way was the Company peculiar. In reply to that he pointed to the outstanding fact that the Hornsey Company was selling gas at the lowest rate in the whole Metropolitan area, without any assistance in the way of transport by water or association with other undertakings. That position was one upon which the Company could congratulate itself, but it was very difficult to live up to it. The low price must be associated with an economy in administration which had been attained only with difficulty and could be preserved only by skill. In considering the accounts one must take into consideration the facts that the area supplied was non-expanding, and that the price of gas from which the revenue was derived was extremely low.

CAPITAL EXPENDITURE.

Referring to the Capital Account, he said it showed that there had been an over-expenditure of capital; the total capital expenditure was £366,719, and the significant fact was that it represented a capital expenditure of something like £459 per million c.ft. of gas sold. In the latter figure lay the strength of the undertaking, because it represented a capital expenditure which was less by about 20% than that obtaining in undertakings working in similar circumstances. It meant that the Hornsey Company was relieved to that degree of providing interest and dividends, and that, of course, was one of the main reasons why the price of gas was low. Where the price of gas was very low one could look intelligently to the capital employed in the business. It was not a final figure, because the plant and assets generally might not be of an entirely satisfactory kind; their value might have deteriorated, and low capital expenditure might be due to faults and infirmities of the administration. He could assure the proprietors, however, that the Hornsey Gas-Works, even to-day, provided a model of efficiency and economical operation; they could not be otherwise, when the Company sold gas as it did.

Coming to the Revenue Account, he said that the receipts for gas, rentals of stoves, &c., had fallen by £4418 as compared with the previous year, owing to the decreased quantity sold. But in respect of residual products the Company had regained £973, notwithstanding that there had been a loss, for the first time, on sulphate of ammonia. The Hornsey Company had held out longer than had any other undertaking in its ability to show a profit on the production and sale of sulphate of ammonia, but it could hold out no longer under present conditions of the extraordinarily depressed price of that commodity. The Company had to continue making it, but as to the commercial wisdom of those who insisted upon making it of their own volition in present circumstances he had a very poor opinion. It was a bye-product in the manufacture of gas, and he was afraid that during the current year the loss on sulphate of ammonia would recur. But taking that loss into consideration, and setting it against the gain on residuals, the Company was nearly £1000 to the good, and this reduced the reduction of revenue due to lower sales of gas to £3669, this being the net reduction on the credit side of the account.

GREATER STORAGE CAPACITY.

The other side of the Revenue Account was much more reassuring. The expenditure on coal, oil, and coke was less than in the previous year by £4468, partly by reason of reduced sales of gas and partly by reason of economies. On the maintenance of plant the Company had expended £2726 more than in the previous year. That was due to the reconstruction of one of the older gasholders. It did not pay to allow a well-constructed gasholder to drop out of use. The tank, which was generally the more expensive portion of the structure, was as good in its old age as in its youth, and sometimes even better, and a considerable portion of the steel structure retained its full value. Therefore, the Company had amplified its already ample storage facilities by this reconstruction. The expenditure on the repair, maintenance, and renewal of mains was £2528 less than in the previous year, and on the repair, maintenance, and renewal of meters it was £1441 less.

The figure for bad and doubtful debts was increased by £529, of which £500 was a reserve. In view of the general financial difficulties, it was wise to take some such precaution.

In regard to superannuation, there was a very important in-

crease of over £3000, but that included a contribution to the Pension Fund, which contribution in itself was not adequate to give that Fund the financial complexion it ought to have. The Fund was inaugurated only recently, and by reason of the Company's responsibility to the contributors it must fortify the Fund until it satisfied the requirements of the Actuary. The contribution to the Fund was part and parcel of the £3689 which was shown in the Account in respect of superannuation.

The Company had received £3669 less on Revenue Account, and had effected economies to the extent of £3228, so that the profit had fallen by £441, to a figure which was ample for the requirements.

The Profit and Loss Account showed that there had been an arbitrary transfer of £5000 to the Contributory Pension Fund. Having made that transfer, and having met the normal preliminary expenditure in connection with interest and so forth, there was carried from the account £945 more than was brought into it. That was a margin perhaps slightly in excess of what was statutorily permissible, but no one could question the wisdom of gaining all the strength that could be gained in this direction in current circumstances. But it would be noted that after the important disbursements and provisions made, the Company's position was practically £1000 better than it was a year ago.

A Damnosa Hæreditas.

The Reserve Fund was the blemish on the whole accounts. It was a *damnosa hæreditas*, and the present administration was not responsible for it. In the old days the Directors had thought that the Fund was invested to better advantage in the business than outside it. That might be possible, but he took strong exception to the policy of putting the proprietors' money to a trade risk, however little that risk might be. The present Directors had invested a very considerable part of the Fund, and if it were in their power to do so they would supplement the Fund, but they could not do so while gas was sold at its present price.

The Special Purposes Fund had reached a very handsome total, and quite a substantial amount of the figure was invested. The Fund was not applicable to normal renewals, but to special purposes, and before it could be used it was necessary to obtain a Chartered Accountant's certificate to the effect that it was used in compliance with the statutory provisions. It afforded an immense protection, however, against the sudden or unavoidable abandonment of any particular plant.

The Renewal Fund Account had a floating balance, and there was no obligation to invest it. There had been transferred to it from Revenue Account £3576. The Fund was available for the renewal and maintenance of the plant over and above the normal; it was a necessary protection and a great facility to the upkeep of the works.

The balance-sheet showed that the investments had a book value of £26,603, whereas their market value was £34,607; so that their value had appreciated about 30%, which was satisfactory. But wherever there was appreciation there was also the concomitant risk of depreciation. Therefore, the values of investments were not written up, although they were written down when depreciation occurred.

The balance-sheet also showed a loan from bankers amounting to £10,000. At the corresponding date in the previous year the amount was £24,000, so that the position of the Company in that respect had been improved by £14,000 during the period under review. The loan had been reduced to £9000 during the current year, so that the relative position of the Company as between capital and its business was improving.

Although the Co-Partners' Contributory Pensions Fund was started only on July 1, 1932, the Company had already established it to meet the Actuary's requirements, and it had a credit of nearly £19,000. That was no mean accomplishment.

Reserve for Income-Tax.

The Company had established a reserve for income-tax, amounting to £1364, because one never knew what the inquisitors would impose, and it was well to have something ready for them. From what had occurred in the House of Commons it was clear that they must not expect any relief.

The Co-Partnership Fund amounted to the very handsome total of £19,300, and that constituted a definite and tangible indication of the material link between the Company and its employees. But it did not by any means represent the whole value of the co-partnership movement; such results as had been achieved by the Company had been largely influenced by the favourable and official influence of co-partnership in the conduct of the Company's affairs. Having been in active touch with the Gas Industry for forty years, he could speak from personal experience, and could say that there was no comparison between the existing relationship of employees of the Company and the executive and the relationship of forty years ago. The change was definitely and specifically due not only to co-partnership but also to the spirit of co-partnership. When practically all the men in the Company were shareholders, some of them very important shareholders, and in the aggregate constituted, through their Trustees, the most important shareholder, they would naturally consider and endeavour to promote their own interests. Whereas in the old days the workers' interest was outside the works gates, to-day it was inside the works gates, and as the result of that interest and definitely created good feeling the Company was assured of the co-operation of all its employees. He felt quite sure of that, and all his colleagues on the Board counted upon it as a most important feature in the discharge of the duties that lay before them.

Mr G. W. Carey (Deputy-Chairman) seconded the motion for the adoption of the Report and Accounts.

Mr. A. W. Oke (a stockholder), in a congratulatory speech, said that the decrease in the sales of gas during 1932 was accounted for fully by the conditions obtaining, and an examination of the accounts of various gas companies showed that only those in whose areas there had been extended building operations had been able to maintain their sales; one or two companies had secured increases of 4 or even 5%. The Hornsey Company had always enjoyed the reputation of being very sound and satisfactory—when he had wanted to acquire its shares he had had to wait three years for the opportunity—and in spite of the financial trouble in the world the shareholders could be assured of its soundness. The Management was guarding the interests not only of the shareholders and the consumer, but also of the men who had to bear the heat and labour of the day. The position was very gratifying. One could not help feeling, however, that possibly the Board might sell some of the Company's gilt-edged securities at the high prices prevailing, reduce the overdraft at the bank, and buy the securities back with advantage later; one felt also that some of the shareholders would like to increase their holdings and would be willing to give almost record prices if further capital were required. However, he had confidence in the wisdom of the Board, and it was a great pleasure to attend the meeting and to hear the Chairman's interesting account of the year's work.

Mr. Oke also assured the Directors how much the shareholders deplored the loss of Mr. Seager Berry. Some of the companies in which he (Mr. Oke) was interested had been glad to consult Mr. Berry from time to time, as a Parliamentary Agent, and by his death the Hornsey Company had suffered a great loss. The shareholders were pleased, however, that Mr. Buckley had been elected a Director.

Mr. A. C. Hovey (a stockholder) also commented upon the pleasure it afforded the shareholders to attend the meetings of the Company and to hear the Chairman's address. In his experience of numerous company meetings it was unique to hear such a lucid explanation of the accounts given by a Chairman without reference to a prepared typewritten statement. Discussing the general stability of the Company, he said that the total reserves amounted to £42,000. In addition, there was carried forward about £25,000, and these two sums together were equivalent to about three years' dividends and debenture interest. Thus the Company was in a remarkable position. He was aware that the various funds were limited by Act of Parliament, and the Directors could not add to them more than a certain amount or withdraw money from them except in the prescribed manner.

Discussing the competition of electricity, he asked what was being done to combat it in the Hornsey district. The electrical industry were employing ladies in their efforts to acquire further custom; he had no doubt that lectures and demonstrations were given on behalf of gas by ladies in the Hornsey district, and he believed an endeavour was being made to form a further association by which the services of ladies were applied to increasing the consumption of gas domestically.

The elevation of a tried and trusted servant (Mr. Buckley) to the Board reflected great credit upon the Board and the Company as a whole. It made shareholders more ready to remain shareholders and to increase their holdings.

The Chairman, replying to Mr. Oke, said there was a strong temptation to sell securities at the prevailing high prices, but the money would have to be re-invested, and one might fall out of the frying pan into the fire in endeavouring to obtain further increments. Gas Company Directors, as trustees, should be very continent and conservative in their treatment of investments, and could not throw the Company's bread on the waters in that direction as in an ordinary technical and administrative way.

He assured Mr. Hovey that the Board had been considering that morning the best means of retaining and developing the Company's business, and they realized the necessity for renewed efforts in that direction. The matter had been in no wise neglected. The Company was employing the very effective aid of women demonstrators and lecturers, because it was extraordinary that the use of gas was one of the matters in regard to which one woman would listen to another. That possibility was being exploited, and the Company was also making special efforts to maintain the efficiency and cleanliness of the gas appliances already in use. That was a most fertile field; it was necessary to fight hard for commercial existence, and the Company was doing that.

(The Report and Accounts were unanimously adopted.)

Dividends.

The Chairman moved:

> "That there be now declared dividends for the half-year ended Dec. 31, 1932 (being the final dividends for the year), as follows: On the 5% Preference Stock, 5% per annum; on the 5% Stock, 7½% per annum; and on the 3½% Stock, 6% per annum; all less income-tax (making, with the interim dividends already paid on the 5% Stock and 3½% Stock respectively 7½% and 6% for the year); and that such final dividends be paid on Saturday, March 4."

The resolution was seconded by Mr. E. L. Burton, and carried unanimously.

The Chairman moved that the retiring Directors—Mr. E. L. Burton and Mr. J. W. Buckley—be re-elected. He added that, in view of what had been said at the meeting, no special pleading was necessary on behalf of these gentlemen. Whereas Mr. Buckley possessed the technical skill, Mr. Burton possessed experience and special knowledge of accountancy to an almost unique degree.

Mr. FRANK H. JONES seconded, and the resolution was carried unanimously.

Mr. E. L. BURTON, in returning thanks for his election, said it was a pleasure to have his name bracketed with that of Mr. Buckley, who was so highly esteemed.

Mr. J. W. BUCKLEY also expressed his thanks and appreciation.

On the motion of Mr. K. R. MACKAY, seconded by Mr. A. H. GODWIN, Mr. Hyde C. Burton, F.C.A., was unanimously re-elected an Auditor of the Company.

Mr. BURTON responded.

Mr. A. H. GODWIN (representing the employee co-partners) took the opportunity to assure the meeting that the co-partnership system had entirely altered the mentality of the workmen; their outlook, he said, had changed entirely, and the sentiment and spirit it created was a stronger factor than the financial benefit.

VOTES OF THANKS.

The CHAIRMAN proposed a vote of thanks to the officers and staff of the Company for their services, and said that practically every figure to which he had drawn attention was an endorsement of the valuable services of the Company's executive officers, whom the Board held in the highest esteem. During the year Mr. Mortimore had assumed the office of General Manager in addition to that of Secretary, and his promotion was the result of assiduous, devoted, and successful service. No one deserved that office more than he or enjoyed the confidence of the Board in higher degree. Mr. Kenneth R. Gandon, the Company's Engineer and District Superintendent, was another valuable officer. The Chairman recalled that he had known his father and his grandfather, and said that Mr. Gandon bid fair to carry on a great family tradition and reputation by his services to the Company. He was comparatively young; Mr. Buckley had left him fields to conquer, and, in his generous way, would co-operate and assist. The Company was very well served by its executive officers, and it owed thanks also to all their subordinates.

Mr. K. R. MACKAY, speaking as a consumer as well as a shareholder, seconded the vote of thanks, and expressed appreciation not only of the low price of gas, but also of the courtesy and attention which consumers received from all officials of the Company. He added jocularly that if they were as prompt in attending to consumers' requirements as they were in sending out the monthly accounts there would be no cause to complain.

The vote of thanks was carried.

Mr. F. G. PILLEY proposed a vote of thanks to the Chairman and his co-Directors for their able management of the affairs of the Company, and said that the list of Directors provided in itself a very good argument for the proposal. The Company was served by a Board of experts; that was not always a recommendation, in his opinion, but undoubtedly the Hornsey Company was served by some of the finest experts in the Gas Industry. The results achieved provided another good reason for thanking them. As one who had known Mr. Buckley when he had first entered the service of the Company, and had known the Company for many years before that time, he appreciated the good work Mr. Buckley had done, and he regarded Mr. Buckley's elevation to the Board as a very good move.

Captain H. F. WILKINSON, M.Inst.C.E., seconded and associated himself with Mr. Pilley's remarks.

The vote of thanks was carried with acclamation.

The CHAIRMAN returned thanks for the goodwill evidenced by the vote of thanks. It had often been said that a vote of thanks was a mere formality, but the Directors would miss it if it were not proposed. He hoped it would encourage them to serve the proprietors even better in the future than in the past, if that were possible.

Lea Bridge District Gas Company

ANNUAL GENERAL MEETING

The Annual Ordinary General Meeting of the Lea Bridge District Gas Company was held at the Offices of the Company, 63 and 64, Chancery Lane, London, W.C. 2, on Tuesday, Feb. 28, 1933—Mr. ARTHUR M. PADDON, M.Inst.C.E., Chairman of Directors, presiding.

The SECRETARY (Mr. Henry Hand) read the notice convening the meeting, after which the seal was affixed to the register of stockholders.

THE CHAIRMAN'S ADDRESS.

The report and accounts having been taken as read,

The CHAIRMAN said that it was common knowledge to all those interested in the Gas Industry that the period to which these accounts related had been one of great commercial depression and difficulty, and it was therefore remarkable that they were able to record an increase—if only a small one—in the sales of gas. It was an exceptional matter compared with many other undertakings, and although the increase was small it constituted one of the few instances in which they were on the right side of the balance-sheet.

It would be seen from the report that during the year £25,000 of 4% perpetual debenture stock had been issued, and in regard to the statement of capital (stock) on page 4 and 5 of the report, they had the necessary capital powers to meet any future development of their business; though he could not, of course, in the circumstances, expect any important developments until there was greater industrial and commercial activity generally. Pages 6 and 7 of the report dealt in more detail with their capital during the past year, and it would be seen that they had spent under this heading £19,341, while they had written off £13,056 by depreciation. They had, therefore, a net increase in capital of £6285 to set against the comparatively small increase in their business of 7 million c.ft. of gas sold. The total capital expended amounted to £488,581, which was equivalent to £471 per million c.ft. This was higher than one would like to see, though it was not a high figure as matters went at the present time, and any company with capital of under £500 per million c.ft. was advantageously placed in this respect.

RESIDUALS BETTER.

Turning to the revenue account, it would be found that there was a decrease in the receipts from gas meter and stove rentals of £1455, partly due to the fact that the sales of gas through prepayment meters had been reduced. There was a total increase from the sales of residuals of £1580, coke and breeze having brought in £205 more, while the receipts from tar and ammoniacal liquor increased by £1375. The total receipts were greater by £125.

On the other side of the account they had saved £1850 on coals, oil, and coke, notwithstanding the increased quantity of gas sold. They had spent more on the repairs of works and plant to the extent of £647, but recorded a decreased expenditure on repairs of mains, services, &c., of £2068, and on repairs to stoves and fittings of £3767. They had disbursed £1325 in officers' superannuation, while they had made a reserve in this matter of superannuation of £3000. There was a limitation imposed upon them by enactment that they should not pay out in superannuations more than the equivalent of ½d. per 1000 c.ft. of gas sold, and they had kept within that limitation. But when they granted superannuations and pensions—as they had power to do—it was necessary for them to make security for payment under these items; so they legitimately made such reservations in the revenue account to make security for future payments. Their expenditure under this head was therefore increased by £3000 as compared with a year ago. Their total expenditure had decreased by £3413, while their profit was £3539 more.

In the profit and loss account it would be seen that they proposed to transfer the sum of £3500 to reserve fund. It was desirable to maintain such a reserve fund to protect the proprietors' dividends, and in these disturbed times it was even more essential that this reservation should be made. The net result was that whereas they brought into the account some £35,867, they were taking out to the next account £40,154—an increased carry-forward of £4287. The balance of net profit to be carried to the next account, subject to the half-year's dividends to Dec. 31, 1932, amounted to £52,327, which was equivalent to two years' payment of dividends—a very substantial security from the proprietors' point of view.

In regard to the benefit account, the interest on investments amounted to £281 15s. 1d., while they had transferred the sum of £1271 10s. 7d. from revenue account, this being the disbursement for the current year.

BALANCE-SHEET.

Turning to the balance-sheet, they would be interested to see, on the credit side, that their investments had a book value of £81,557; but, owing to the present somewhat abnormal appreciation in investments, their actual value at Dec. 31 last was £107,453. Had this been a depreciation they would have written their investments down; but being appreciation they were allowed to remain at their book value in the balance-sheet. The suspense account, relating to their inclined retort installation, showed a figure of £7000, which figure had been decreased by £3500. On the other side they would note the figure of reserve for superannuation, previously referred to, of £3000. There was also a figure of £9719, being the provision for renewal of vertical retorts. They had not had a renewal fund as yet, and now certain necessary expenditure on renewals to their vertical retort plant could be met out of this fund. They would observe that the co-partnership fund stood at £26,154, of which £24,292 was invested in the Company's stock. From the social or domestic point of view, their co-partnership scheme had been well maintained, which afforded a great measure of security to the proprietors in connection with the conduct of the undertaking. It would not be nice to look back upon the days when they were without co-partnership, and one must really look to those instances where co-partnership did not exist to understand its real value in times of difficulty and distress. Most of the industries in this country would be only too glad to have the help of co-partnership as their Company had.

In regard to the future, they might, perhaps, be a little

anxious, in view of the keen competition which was taking place. He had recently been looking into the statistics of the Gas Industry in the United States of America, and there he found that business had depreciated by 5%. In this country they must be prepared for some limitations of their progress, but they sincerely hoped that they would not lose ground. Up to the present they were still slightly ahead of last year, and in so far as the supply of gas in their district was rather in the nature of a necessity to the public than merely an amenity, they could look for further progress. Compatible with efficiency, their economies would continue to be exercised, and he could assure them that their works and plant had been maintained in the highest possible state of efficiency; they were, in fact, more efficient than they were twelve months ago. They had added all those processes which made for economy, and he had not the slightest doubt that on the technical side the Company would be as successful in the coming year as it had been in the past.

The CHAIRMAN then formally moved the adoption of the Directors' report and statement of accounts.

The DEPUTY-CHAIRMAN (Mr. G. W. Carey) seconded the resolution, and, there being no response to the Chairman's invitation to discuss the accounts, the resolution was put to the meeting and carried unanimously.

DIVIDENDS.

The CHAIRMAN thereafter moved that dividends for the half-year ended Dec. 31, 1932, be paid at the following rates (all less income-tax):

5 % per annum on the 5% preference stock;

6 % per annum on the 6% preference stock; and

8½% per annum on the consolidated ordinary stock,

payable on Tuesday, March 7, 1933, and that the sum of £3500 be transferred to the reserve fund.

Mr. E. L. BURTON, F.S.A.A., seconded the resolution, which was unanimously agreed to.

RE-ELECTION OF DIRECTOR AND AUDITOR.

The CHAIRMAN moved that Mr. G. W. Carey be re-elected to the Board, being the Director retiring by rotation. Mr. Carey had been in the Company now for nearly thirty years, and most of that time he had been Deputy-Chairman. Mr. Paddon's office certainly never caused him any anxiety while he had the support of Mr. Carey as Deputy-Chairman. He had a very wide experience of the conduct of gas undertakings.

Mr. STANLEY HUNTER JONES, M.Inst.C.E., seconded the motion, which was carried unanimously, and, in reply,

Mr. CAREY said that he was very much obliged for his re-election to the Board.

On the proposition of Mr. E. A. PIERCE, seconded by Mr. D. C. ROBERTS, the retiring Auditor, Mr. Robert Ernest Gisburne, was unanimously re-elected.

VOTES OF THANKS.

The CHAIRMAN, moving a vote of thanks to the Officers and to all those engaged in the interests of the Company, said that they never deserved this vote more than they did on the present occasion. In ordinary circumstances they were able to chronicle a considerable increase in their sales of gas, which carried with it certain qualities which recommended the accounts to the proprietors. On this occasion they had been in a greater degree than usual dependent upon their executive officers, and the accounts they had before them that day were the result of economies without sacrificing efficiency. Arbitrary economies could always be carried out; but they had to maintain the efficiency of their apparatus and all the various forms of organization in the Company. This had been done. They had lost no ground in that regard, and they were perfectly ready to take advantage of future developments. They owed their officers a greater amount of thanks. In their Engineer and Manager, Mr. D. C. Cross, they had an assiduous servant, who placed his talents unreservedly at their disposal, and they could have no better proof of his merits than the revenue account before them. Their Secretary, Mr. Hand, had been with them for forty-one years, and his experience and conversancy with every detail of the Company's past and present activities had been of incalculable assistance to the Directors.

Mr. E. A. PIERCE seconded the vote of thanks, which was heartily accorded.

Mr. HAND, replying on behalf of himself and his staff, thanked them very much for the kind remarks which had been made.

Mr. D. C. CROSS also replied to the vote on behalf of himself and his staff. In their district, he said, they were troubled by unemployment more, perhaps, than in many other areas in London, and the employees of their Company were very grateful that they were associated with an industry which was quite stable. The Company was extremely happy in the co-operation which existed between the Directors, the Officers, and the workpeople, and it was the result of this co-operation and contentedness which helped them to keep their works in the high state of efficiency they were in.

Mr. E. A. PIERCE proposed, and Mr. G. G. HILL seconded, a vote of thanks to the Chairman and Directors, which was heartily accorded, the CHAIRMAN briefly acknowledging.

This terminated the business of the meeting.

Gas Companies' Results in 1932

Aberystwyth.

The Directors of the Aberystwyth Gas Company recommended the payment of the usual dividends, less income-tax—viz.: On the original shares at the rate of £15% per annum; on the new shares at the rate of £10 10s.% per annum; on the preference shares at the rate of £5% per annum; on the debenture bonds (interest) at the rate of £4 10s.% per annum, less the interim dividends paid on Sept. 1 last.

Bath.

The Directors of the Bath Gas Company announce that due to failing health and advancing years, Mr. R. E. Commans retired from the Board in November last. To fill the vacancy on the Board thus caused, the Directors have elected Mr. I. J. Pitman. With reference to the Company's application to the Board of Trade for the Order referred to in last year's report, the decision of the Board of Trade on the questions argued before them on Dec. 17, 1931, was not received until April 12, 1932, when the Board of Trade intimated that they adhered to their intention of substituting a single basic price for the basic prices agreed to between the Company and the Corporation of Bath. The Board of Trade, after another hearing on May 12, 1932, on the question of the amount of such single basic price, laid the Order in single basic price form on the table of both Houses of Parliament. On June 15, 1932, the Corporation of Bath lodged a petition asking that the Order should be restored to its original form in order that the agreement between them and the Company could be carried into effect. This petition was referred to a Select Committee of the House of Lords, and the hearing took place on June 28 and 29, 1932, when the Committee reported that the Order should be restored to its original form. The Board of Trade was not prepared to move the Order in this form in Parliament, but after protracted negotiations, the Order was, on Nov. 15, 1932, passed by both Houses of Parliament with the restoration of the multiple basic prices originally agreed between the Company and the Corporation of Bath. An interim maximum dividend at the rate of 5% per annum, less income-tax, was paid in August last for the half-year to June 30, 1932, and the Directors recommended the declaration of a dividend at the same rate, less income-tax, for the half-year ended Dec. 31, 1932.

Brighton, Hove, and Worthing.

The Annual General Meeting of the Brighton, Hove, and Worthing Gas Company was held at the Offices of the Compan, 5, Great Winchester Street, E.C.—Mr. A. M. Paddon, Chairman of Directors, presiding. Before moving the adoption of the report and accounts, the Chairman referred to the sense of loss the Directors felt in the death of one of their colleagues, Mr. Seager Berry, in whose place the Directors had succeeded in attracting to their numbers Sir Henry Cautley, K.C., M.P., whose legal position, judicial experience, and long association with legislation were of the greatest advantage to the Company. Turning to the accounts, the Chairman said they had expended on capital account the sum of £115,710, and they had been able to reduce this through depreciation and realization by £20,163, leaving a total expenditure of £1,411,581. That amounted to £512 of capital for every million c.ft. sold. If they went to the other side of the account and took the figure of £1,724,906—the total receipts as distinct from expenditure, less the amount added on conversion—it still remained at the comparatively low figure of £544 per million. In the revenue account it would be seen that the sales of gas had brought them in £3713 less upon a total of £517,000 odd—not a very large amount commensurate with their small decrease of gas sold of just under 1%. From rentals of meters, stoves, and fittings they had received £2816 less and from residual products £4587 less. They had thus a decrease in their receipts of £11,145 upon a total of £719,000. They had saved on coal, oil, and coke £15,796. Upon works and maintenance they had expended £5089 less. Inspectors, rental clerks, &c.—£13,190—was £3034 less; but they must take with that item the cost of collection, which was £4233 more. Readjustments between those entries more or less balanced each other. In repair, maintenance, and renewal of mains their expenditure was £4197 less, while in the repair of stoves and fittings they had spent £7279 more. Their maintenance charges amounted to 15½d. per 1000 c.ft. The only other item he need refer to on that side of the account was the transfer of £12,000 to the special purposes fund. The net result in regard to these disbursements was that their economies amounted to over £13,000, while their decrease in receipts amounted to £11,145, with the result that their profit was nearly £2000 greater than it was 12 months ago. Turning to the

profit and loss account, on the right-hand side they had the transfer of £2500 to reserve fund, which was made 12 months ago but appeared for the first time in this account. On the other side it would be seen that they carried forward £48,881, as against £48,726 brought into the account; so that irrespective of all disbursements and appropriations they were £154 to the good in a singularly unpropitious and difficult period. The renewal fund stood at £26,000—a good figure—and quite a material amount of this (£11,060) has been invested. The book value of their investments was £173,277; the favourable feature being that on Dec. 31 these had a realizable value of £225,414. Their co-partnership fund amounted to over £80,000. Interim dividends declared by the Directors for the half-year ended June 30, 1932, were paid on Aug. 30, 1932, as follows: £3% on the "B" preference consolidated stock; £3% on the "D" redeemable preference stock; £3 15s.% on the 6% standard consolidated stock; and £3 7s. 6d.% on the 5% standard consolidated stock (all less income-tax); and dividends were declared for the half-year ended Dec. 31, 1932, being the final dividends for the year, at the same rates, £5000 being transferred to reserve fund.

Bristol.

The 133rd Ordinary General Meeting of the Bristol Gas Company was held at the Offices, Colston Street, Bristol, Mr. George H. Boucher (Chairman) presiding. Moving the adoption of the report and accounts, the Chairman said: During the past ten years our Company has increased its sale of gas by 750 million c.ft., or over 20%. The number of our consumers now amounts to 109,445—an increase of 3874 over 1931, and an increase of 34,413 during the last 10 years. The number of gas cookers issued by the Company amounted on Dec. 31 last to 98,266—an increase of 3921 over 1931, and an increase of 33,493 during the last 10 years. The figures mentioned only include the gas cookers hired by the Company and do not include all the cookers sold by the Company and by outside firms—which must amount to a very large number. All new consumers put on our books last year adopted gas for cooking purposes, and as 61% of the gas sold was used during daylight hours, it is obvious that the use of gas for industrial and domestic purposes is increasing. The number of high-grade appliances issued under the hire-purchase system since its introduction four years ago now amounts to 17,000—an increase of 5000 during the year—which is a highly satisfactory figure. We have now 526 miles of mains and 375 miles of services—a total of 901 miles—an increase over last year of 18 miles of mains and services. The number of consumers per mile of main amounts to 208—as compared with 154 in 1910. Our profits for 1932 amount to £103,576—a slight increase on 1931—though our receipts for gas are just over £7000 less and for residuals £5000 less. I think these results show that the Company has been carefully and economically managed. The balance we propose to carry to next year's accounts, after providing for the dividend this year, is £93,238. A dividend at the rate of 5% per annum for the half-year, less income-tax, was declared.

Canterbury.

The Directors of the Canterbury Gas and Water Company submitted a report for the year ended Dec. 31, 1932, which stated that the reduction of ½d. per therm in the price of gas as from Jan. 1, 1932, and a small decrease in the quantity sold, owing to the mild weather experienced during the year, is responsible for the lowered receipts derived from the sale of gas. New coal-charging and coke-conveying machinery has just been erected at the gas-works, and it is anticipated that an appreciable reduction in the cost of manufacture will result therefrom. In April last tenders were accepted for £2600 gas and £11,000 water mortgages. After payment of interest on the loan capital, there is standing to the credit of the dividend account the sum of £8710. An interim dividend of 4% having been paid in August last, the Directors recommended a further dividend of 6%, less income-tax, making the uniform dividend on the total capital 10% for the year.

Chester.

The balance of net revenue account of the Chester United Gas Company, after payment of interest and dividend on debenture and preference stocks and the interim dividend of 2½% on ordinary stock, is £14,079. The Directors recommended the payment of a dividend on the ordinary stock of 3½%, making 5¾% for the year. The amount to be allocated for this dividend will be £5356, leaving a balance to carry forward of £8722. In September last Dr. G. C. Clayton felt compelled to resign his seat on the Board owing to his Parliamentary and other duties and responsibilities. During his Directorship of the Company Dr. Clayton's services have been of great value and his resignation was very regretfully received by the Board. The vacancy thus created was filled by the appointment of Mr. William Cullimore.

Dorchester.

The sales of gas by the Dorchester Gas and Coke Company again show an increase, the quantity sold for the year being 378,493 therms, or 84,109,600 c.ft.; this compared with last year shows an increase of 2,488,900 c.ft., or 3%. The price of gas was further reduced at the beginning of the year from 10·66d. to 10·22d. per therm, or 2d. per 1000 c.ft., making the price equivalent to 3s. 10d. per 1000 c.ft. The Company is now entering upon the one hundredth year of its career. The Directors recommended a final dividend of 6% on the preference capital, less income-tax, and 10% on the ordinary capital, free of income-tax.

East Surrey.

The Annual Meeting of the East Surrey Gas Company was held on Feb. 23—Mr. W. Lees Stenning, J.P., M.B.E. (Chairman of Directors), presiding. The report on the year's working, presented to the proprietors, showed that, partly due to economic conditions, but mainly to unusually mild weather experienced during the March quarter, the sale of gas for the year by the East Surrey Gas Company shows a small decrease of 1·21%. In April £20,000 5½% preference "A" stock, issued by tender, was heavily over-subscribed at satisfactory prices. Dividends at the under-mentioned rates per annum respectively—6% on the cumulative preference stock, 5½% on the preference "A" stock, and 6% on the ordinary "B" stock, all less income-tax—were paid for the half-year to June 30. The Directors recommended that similar dividends be paid in respect of such capital for the second half-year, less income-tax. Moving the adoption of the report and accounts, the Chairman said: Although the sale in 1932 is somewhat lower, the year shows marked progress in other directions, which enables us to look forward with every confidence to the future. The number of consumers has increased by 630, and no fewer than 2632 additional appliances have been fixed. These include 1036 cooking stoves, 703 gas fires, and 631 water heaters. To meet the prospective demand, larger mains have been laid in several districts, and extensions made to new ones. We issued in April further capital to the extent of £20,000 5½% preference stock, which was over-subscribed to the extent of £40,000. Turning to the revenue account, there is only one item to which I think it is necessary to draw attention. The receipts from gas and rentals together show a reduction of £5690 compared with 1931. Of this, £4050 is accounted for by the reduced gas charges brought into force at the beginning of the year, and the balance by the smaller output. On the other hand, expenditure generally has decreased. As a final result the balance carried to profit and loss account is £30,195—an increase of £1102 over 1931. After adding the sum brought forward and deducting all fixed charges, bank interest, miscellaneous items, and the dividends already paid to June 30 last, there remains the sum of £13,572—sufficient for the provision of dividends at the same rates as those paid for the first half-year, and to carry forward to 1933 the sum of £5237.

Hartlepool.

The profit of the Hartlepool Gas and Water Company for the year, after including grants received from H.M. Treasury under Development (Loan Guarantees and Grants) Act, 1929, and paying interest on debentures, &c., is £27,525, which, together with the sum of £23,483 brought forward from last year, makes a total of £51,009. After paying an interim dividend of 2½%, less income-tax, there remains an available balance of £37,284, out of which the Directors proposed a final dividend of 2½%, less income-tax (making 5% for the year), absorbing £13,725, and leaving a balance of £23,559 to carry forward to the next account. Mr. J. Stanley Appleby presided at the Annual Meeting of the Company, and remarked that in spite of the difficulties there was an improvement in their position.

Isle of Thanet.

The business of the Isle of Thanet Gas Light and Coke Company has continued satisfactory, the sale of gas being 467,839,500 c.ft., as compared with 468,984,100 c.ft. during the previous year. The very slight decrease of less than ¼% is attributed to the exceptionally mild autumn. The balance standing to the credit of profit and loss account, after transferring £1500 to the reserve fund and providing for the final dividend, stands at £12,268. A final dividend of 4% was recommended, which, with the interim dividend of 4% paid on Sept. 29 last, gives 8% for the year (less income-tax).

Liverpool.

The Directors of the Liverpool Gas Company present a statement of the Company's accounts for the year ended Dec. 31 last, which show that the total revenue during that period was £1,401,714, and the expenditure £1,186,040, leaving a surplus of £215,673, which had been transferred to the credit of net revenue account. After deducting the amount taken for payment of the dividend on the ordinary stock declared last August and on the preference stock for the year, together with the interest on debenture stocks and mortgages, there remains a balance out of which the Directors recommended that a dividend for the half-year ended Dec. 31 last be declared of 3% on the ordinary stock of the Company. The Directors report that the Liverpool Gas Order, 1932, under which the Company takes over the undertaking of the Huyton and Roby Gas Company, and which also confers other powers on the Company, received Parliamentary sanction on Dec. 22, 1932. It is with the deepest regret that the Board have to record the death of their late Chairman, Sir Henry Wade Deacon, LL.D., J.P., who had been a Director of the Company for 30 years, during the last 28 years of which he occupied the position of Chairman. The vacancy on the Board has been filled by the appointment of Lt.-Col. Albert Buckley, D.S.O., J.P.

Maidstone.

The accounts of the Maidstone Gas Company for the year showed that after providing for all fixed charges (including £2000 for depreciation of meters, and £1635 for the renewal fund) there

remains an available balance of £22,178, which, together with the balance of £13,165 brought forward from the previous year, and £334 interest on investments, makes a total of £35,679. Income-tax, interest on debenture stock, deposits, &c., together amount to £8793. The interim dividend paid on Sept. 1, 1932, absorbed £4972, and the sum of £1800 has been transferred to the reserve fund, bringing the total of this fund to £21,951. The balance at the credit of profit and loss account is £20,113. The Directors recommended that a dividend of 9% be paid for the year, less tax at 5s. in the £, subject to the interim dividend of 4%, less tax, paid on Sept. 1 last. The sales of gas compared with those of the previous year show a slight reduction of 0·15%. The revenue from residual products shows a gratifying increase of £821. A supply of gas to houses on the Bridgewood Estate on the Maidstone-Rochester Road, is now being given, and over 100 consumers have been obtained. The Directors announce with much regret the death of their esteemed Chairman, Mr. Edward Hills, who had been a Director of the Company for 34 years. The Directors wish to place on record their appreciation of the long and valued services rendered to the Company by Mr. Hills. To fill the vacancy thus created, Mr. Percy Good has been appointed a Director. Mr. Gerald C. Mercer has been appointed Chairman, and Mr. Bernard A. Smythe, Deputy-Chairman, of the Company.

Rochester, Chatham, and Gillingham.

A satisfactory report was presented to the stockholders at the General Meeting of Rochester, Chatham, and Gillingham Gas Company held at the Offices of the Company, 95, High Street, Rochester. In spite of a reduction in the price of gas and the granting of special discounts to large consumers, the Directors were able to declare a dividend of 6½% on the consolidated ordinary stock for the year. Alderman E. W. Willis presided. The Directors' report stated: The gas sold shows a decrease of 0·2% as compared with 1931. The Directors consider this satisfactory, bearing in mind the general depression in trade and the mild weather. Preference stock of the nominal value of £50,000, bearing interest at the rate of 6% per annum was redeemed by the issue of consolidated ordinary stock, for which applications were made greatly in excess of the amount offered for sale. A dividend at the rate of 6¾% per annum on the consolidated ordinary stock, less income-tax, was paid in August last in regard to the half-year ended June 30, 1932. The Chairman, moving the adoption of the Directors' report and the accounts, said that consolidated ordinary stock was issued during the year for the purpose of redeeming 6% preference stock. The result of that issue was particularly pleasing, and premiums amounting to £3255 now appear in the capital account.

Scarborough.

The Annual Meeting of the Scarborough Gas Company was held on Feb. 18—Mr. E. R. Cross presided in the absence of the Chairman of Directors. The report on the year's working, presented to the proprietors, showed that the price of gas during the whole year has been less than the basic rate of 9·2d. per therm; therefore, in accordance with the Scarborough Gas (Consolidation) Act, 1927, the Directors recommended that the dividend for the year on the ordinary stocks be increased from 5% to 6%, which will account for £2361, that £111 be carried to the reserve fund account, and that the total of these two amounts, £2473, be placed to the profit-sharing scheme; this amount being one-sixth of £14,839 which was the "Consumers' Benefit" for the year. The balance standing at credit of net revenue, after taking into account interest charges, interim dividend, &c., is £15,813, and, after providing for final dividend, &c., there remains a balance of £3117 to carry forward. The statutory interim dividends of 2½% on the preference and ordinary stocks were paid on Aug. 12 last, and the final dividends of 2½% on the preference stocks and 3½% on the ordinary stocks were payable on and after Friday, Feb. 24, 1933. Owing to the unusually mild weather during the winter and autumn, and to the adverse summer season, the sale of gas showed a small decrease of 2·8%; the quantity sold being 642 million c.ft. (2,891,483 therms), as compared with 661 million c.ft. (2,974,639 therms) for the previous year.

York.

Sir John Hunt (Chairman of Directors) presided at the Annual General Meeting of the York Gas Company. The annual report of the year's working, presented to the proprietors, showed that the profit for the year amounted to £20,751, to which has to be added the balance of net revenue brought forward from last year of £10,686, and grants received from H.M. Treasury under Development (Loan Guarantees and Grants) Act, 1929, amounting to £143, making a total to the credit of profit and loss (net revenue) account of £31,581. From this has to be deducted debenture interest, the interim dividends paid, 2% on "A" preference stock, less tax at 5s. in the £, 2% on consolidated ordinary stock, less tax at 5s. in the £, and debenture discount redemption account, leaving a balance of £20,890. Out of this the Directors recommended the payment of balance dividends as follows: On £50,000 "A" preference stock at 2% (making 4% for the year), less tax; on £370,000 consolidated ordinary stock at 3% (making 5% for the year), less tax, which leaves a balance of net revenue to be carried forward of £11,815. The quantity of gas accounted for during the year was 3,875,032 therms.

Industrial Gas Furnace Development

Gas Furnaces built and on order since 1929 consume annually

160 MILLION CUBIC FEET

Total consumption of Gas and Coke on all Furnaces and Tunnel Kilns built by us

GAS
1½ MILLION CUBIC FEET PER DAY

COKE
100 TONS PER DAY

Will our many Friends in the Gas Industry kindly note

GIBBONS — DUDLEY

GAS MARKETS & MANUFACTURES

Stock Market Report.

[For Stock and Share List, see later page.]

The banking moratoria in the United States were largely responsible for a diminution in Stock Exchange activity during the greater part of last week, and most markets were dull and uninteresting. In spite of the cheapness of money, commitments, even for high-class securities, were on a much reduced scale, and the general attitude appears to be one of caution. There was no actual alarm over the various international affairs, and at the close the tone was generally better, with a revival of interest in the Home Railway market, on the re-opening of the wages question, and a slightly increased demand for British Government securities.

Business in Gas stocks and shares was about normal, any securities on offer being speedily absorbed. Prices remained firm, and several of those stocks which became *ex* div. a week ago have since improved in value—*e.g.*, Croydon 5% maximum gained 2 points to 102½, and Portsmouth 5% maximum rose 5 to 104½, at which prices the yields work out at £4 17s. 6d.% and £4 15s. 8d.% respectively and, having regard to the security offered, constitute attractive investments. Southampton 5% maximum at 105½ is in a similar category, the yield being only slightly less in this case. It will be seen by reference to the Stock and Share List that Bristol 5% maximum, with its large local popularity, is quoted at 112 on the Bristol Exchange; on the London Exchange the price is 109½.

It is interesting to note the effect which the change in investment values, coupled with a greater demand, has had on our securities, and the following list of ordinary stock prices, taken at random from the List, indicates the appreciation which has accrued since a year ago:

—	Prices.		Increase in Value.
	1932.	1933.	
Brighton 6%	114–119	143–148	29
British	110–115	145–150	35
Croydon sliding-scale	107–110	143–148	37
East Hull	71–76	102–107	31
Gas Light units	208.–218.	258.–268	58.
Hastings 5%	95–100	130–140	37½
Lea Bridge	129–132	165–170	37
Newcastle units	168. 3d.–178. 3d.	238. 6d.–248. 6d.	78. 3d.
North Middlesex	105–110	135–145	32½
Portsmouth con.	116–121	152–162	38½
South Metropolitan	99–102	124–129	26
South Shields	120–125	150–155	30

Current Sales of Gas Products.

The London Market for Tar Products.

LONDON, *March* 6.

There is little change to report in the prices of tar products, which are as follows:

Pitch is about 95s. per ton f.o.b.

Creosote is 3½d. to 4½d. per gallon f.o.b., according to specification.

Refined tar is about 4¼d. to 4½d. per gallon in bulk at makers' works.

Pure toluole is about 2s. 3d.; pure benzole, about 1s. 11d.; solvent naphtha, 95/160, about 1s. 7d. to 1s. 8d.; and 90/140 pyridine bases, 3s. 6d. to 3s. 9d. per gallon naked at makers' works.

Tar Products in the Provinces.

March 6.

The average prices of gas-works products during the week were: Gas-works tar, 34s. to 39s. Pitch—East Coast, 85s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 85s. f.o.b.* Toluole, naked, North, 1s. 9d. to 1s. 10d. Coal-tar crude naphtha, in bulk, North, 6d. to 6¼d. Solvent naphtha, naked, North, 1s. 5½d. to 1s. 6d. Heavy naphtha, North, 10d. to 11d. Creosote, *ex* works, in bulk, North, liquid and salty, 2¼d. to 2¾d.; low gravity, 1¼d.; Scotland, 2¼d. to 2¾d. Heavy oils, in bulk, North, 4¾d. to 5¼d. Carbolic acid, 60's, 2s. 7d. to 2s. 8d. Naphthalene, £9 to £10. Salts, 55s. to 75s., bags included. Anthracene, "A" quality, 2½d. per minimum 40%, purely nominal; "B" quality, unsaleable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *March* 4.

Business remains rather dull with prices irregular. No material alteration is anticipated until the road tar season commences.

Crude gas-works tar.—The actual value is 45s. to 50s. per ton *ex* works.

Pitch.—Export business is poor and value remains at round 85s. per ton f.o.b. Glasgow. For home trade, distillers are quoting 85s. to 90s. per ton *ex* works in bulk.

Refined tar to Ministry of Transport Specification is still being held for 3¾d. per gallon naked *ex* works, but buying is slow.

Creosote oil continues dull with prices easy. B.E.S.A. Specification is 2½d. to 3d. per gallon; low gravity, 2¼d. to 2¾d. per gallon; and neutral oil, 2½d. to 3d. per gallon—all *ex* works in bulk.

Cresylic acid.—There is more demand, but prices remain weak. Pale, 97/99% is 10d. to 11d. per gallon; dark, 97/99%, 9d. to 10d. per gallon; and pale, 99/100%, 1s. 1d. to 1s. 2d. per gallon—all f.o.r. in buyers' packages.

Crude naphtha is firm at 4½d. to 5d. per gallon *ex* works, according to quantity and quality.

Solvent naphtha.—90/160 grade is 1s. 2d. to 1s. 3d. per gallon, and 90/190 grade is 11d. to 1s. per gallon.

Motor benzole.—Production is well looked after at 1s. 4d. to 1s. 5d. per gallon *ex* works in bulk.

Pyridines.—90/160 grade is 2s. 9d. to 3s. per gallon, and 90/140 grade 3s. to 3s. 3d. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time.

	s. d.		s. d.	
Crude benzole	0 10½	to	0 11	per gallon at works
Motor ,,	1 6½	,,	1 7	,, ,, ,,
Pure ,,	1 10	,,	1 11	,, ,, ,,

Contracts Advertised To-Day.

Carbonizing Plant.

Oldbury Urban District Council. [p. 644.]

Trade Notes.

Messrs. Nichols Compressors, Ltd.

Mr. H. A. S. Gothard, A.M.I.Chem.E. (Managing Director of Messrs. G. K. S. Combustion Company, Ltd., 11, St. Mary-at-Hill, London, E.C. 3; telephone: Royal 3818) has completed an arrangement whereby he becomes sole distributor for the products of Messrs. Nichols Compressors, Ltd., Northallerton, Yorks., for London and the Home Counties.

Gas Acts (1920 and 1929) Orders.

SPECIAL ORDERS.

Wallasey Corporation.

The Corporation are applying for a Special Order to provide for the transfer to them of a part of the undertaking of the Hoylake Urban District Council situated in the parish of Saughall Massie. Also for the transfer to them of a part of the undertaking of the Birkenhead Corporation situated in the parishes of Upton and Bidston-cum-Ford.

STOCK AND SHARE LIST.

Official Quotations on the London and Provincial Stock Exchanges.

[For Stock Market Report, see earlier page.]

Issue. £	Share.	When ex-Dividend.	Dividends. Prev. Hf.-Yr. % p.a.	Dividends. Last Hf.-Yr. % p.a.	NAME.	Quotations. March 4. (Provincial Exchanges March 3.)	Rise or Fall on Week.	Transactions. Lowest and Highest Prices During the Week.
1,551,868	Stk.	Oct. 3	7½	7½	Alliance & Dublin Ord. ...	112–122	...	116–117½
374,000	..	Jan. 9	4	4	Do. 4 p.c. Deb. ...	85–95	...	...
557,655	..	Aug. 22	7	7	Barnet Ord. 7 p.c.	147–152	...	149
300,000	1	Oct. 17	1/93	1/43	Bombay, Ltd.	24/6–26/6	...	...
178,280	Stk.	Feb. 20	9½	9½	Bournemouth sliding scale	192–202*	...	197½–201
550,050	..	..	7	7	Do. 7 p.c. max. ...	152–162*	...	157
489,160	..	..	6	6	Do. 6 p.c. Pref. ...	137–152*	+1	137–141½
50,000	..	Dec. 19	3	3	Do. 3 p.c. Deb. ...	75–80	...	...
162,025	..	..	4	4	Do. 4 p.c. Deb. ...	98–103	...	100
210,000	..	..	5	5	Do. 5 p.c. Deb. ...	120–125	...	...
357,900	..	Aug. 22	7½	7½	Brighton, &c. 6 p.c. Con. ...	143–148	...	143
540,000	..	..	6¾	6¾	Do. 5 p.c. Con. ...	133–138	...	136
195,500	..	..	6	6	Do. 6 p.c. B Pref.	135–145	...	...
1,487,500	..	Aug. 8	5	5	Bristol 5 p.c. max.	111–113*a*	+½	...
120,420	..	Dec. 19	4	4	Do. 1st 4 p.c. Deb. ...	99–101*a*	...	...
217,870	..	..	4	4	Do. 2nd 4 p.c. Deb. ...	97–99*a*	...	...
328,790	..	..	5	5	Do. 5 p.c. Deb.	120–124*a*	...	...
855,000	..	Oct. 3	8	7	British Ord.	145–150	...	147–148
100,000	..	Dec. 19	7	7	Do. 7 p.c. Pref.	140–150	...	...
350,000	..	..	—	5½	Do. 5½ p.c. Pref. ...	105–110	...	...
120,000	..	..	4	4	Do. 4 p.c. Red. Deb. ...	95–100	...	...
450,000	..	..	5	5	Do. 5 p.c. Red. Deb. ...	105–115	...	...
160,000	..	Jan. 9	5	5	Cambridge 5 p.c. Deb. ...	117–122	...	...
100,000	10	Dec. 5	6	6	Cape Town, Ltd.	7½–8½	...	...
100,000	10	Nov. 7	4½	4½	Do. 4½ p.c. Pref. ...	6–7	...	...
150,000	Stk.	Dec. 19	4½	4½	Do. 4½ p.c. Deb. ...	88–93	...	...
626,860	..	Feb. 20	6	6	Cardiff Con. Ord.	108–113*	...	...
237,860	..	Jan. 9	2¾	5	Do. 5 p.c. Red. Deb.	105–110	...	...
157,150	..	Feb. 20	5	6½	Chester 5 p.c. Ord.	93–98*	...	...
98,936	1	Oct. 17	2/-	2/-	Colombo, Ltd. Ord.... ...	25/–30/	...	...
24,500	1	Oct. 17	1/4½	1/4½	Do. 7 p.c. Pref. ..	19/- -21/-	...	...
609,204	1	Oct. 17	-/10 90	-/11 47	Colonial Gas Assn. Ltd. Ord.	16/- -18/-	...	...
296,053	1	..	1/2 54	1/3 30	Do. 8 p.c. Pref.	19/6 21/6	...	...
1,796,965	Stk.	Feb. 20	5	6½	Commercial Ord.	111–116*	...	113½–115½
475,000	..	Dec. 19	3	3	Do. 3 p.c. Deb. ...	75–80	...	80
265,272	..	—	—	—	Do. 5 p.c. Deb. ...	118–123	...	120
807,560	..	Feb 20	7	7	Croydon sliding scale ...	143–14 *	...	145–147
469,590	..	..	5	5	Do. max. div.	100 103*	+2	99½–100
500,000	..	Jan. 9	5	5	Do. 5 p.c. Deb.	117–122	...	...
542,270	..	Aug. 8	10	7	Derby Con.	150–163*c*	...	...
55,000	..	Jan. 9	4	4	Do. 4 p.c. Deb.	80–85*c*	...	...
209,000	..	Sept. 5	5	5	East Hull Ord. 5 p.c. ...	102–107	...	102½
179,500	..	Aug. 22	5¾	6	East Surrey Ord. 5 p.c. ...	120–125	...	...
155,019	..	Dec. 19	5	5	Do. 5 p.c. Deb. ...	117–122	...	...
1,002,180	..	Sept. 19	16½	15	European, Ltd.	133–138	...	135–137½
19,373,992	..	Feb. 20	5¾	5¾	Gas Light & Coke 4 p.c. Ord.	25/–26/-*f*	...	25/6–26/4½
2,600,000	..	..	3½	3½	Do. 3½ p.c. max.	82–87*	...	86½
4,477,106	..	..	4	4	Do. 4 p.c. Con. Pref. ...	100–105*	...	101½–103½
6,102,497	..	Dec. 19	3	3	Do. 3 p.c. Con. Deb. ...	79 83	+1	81½–82½
3,642,770	..	..	5	5	Do. 5 p.c. Red. Deb. ...	114–118	+½	116–118
3,500,000	..	..	4½	4½	Do. 4½ p.c. Red. Deb. ...	110–113	...	111–112
270,466	..	Aug. 22	—	6	Harrogate New Cons. ...	110–115	...	...
82,500	..	Aug. 22	7	7	Hastings & St. L. 5 p.c. Conv.	130–140	...	...
258,740	..	..	5½	5½	Do. 3½ p.c. Conv.	107–112	...	...
70,000	10	Oct. 17	‡10	‡10	Hongkong & China, Ltd. ...	9½–10½	...	...
213,200	Stk.	Aug. 22	6	6	Hornsey Con. 3½ p.c. ...	118–123	...	...
5,600,000	..	Nov. 21	14	10	Imperial Continental Cap.	210–220	...	210½–213
223,130	..	Feb. 6	3½	3½	Do. 3½ p.c. Red. Deb.	89–94	...	90
235,242	..	Aug. 8	8½	8½	Lea Bridge 5 p.c. Ord. ...	165–170	...	...
2,145,907	..	Aug. 22	6	6	Liverpool 5 p.c. Ord. ...	123–125*b*	...	...
245,500	..	Dec. 19	5	5	Do. 5 p.c. Red. Pref. ...	105–115*b*	...	...
306,083	..	Jan. 19	4	4	Do. 4 p.c. Deb. ...	99–101*b*	...	...
165,786	..	Feb. 20	8	10	Maidstone 5 p.c. Cap. ...	180–200*	...	...
56,176	..	Dec. 19	3	3	Do. 3 p.c. Deb. ...	68–73	...	...
75,000	5	Dec. 5	‡10	‡10	Malta & Mediterranean ...	8–9	...	...
392,000	—	Oct. 1	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	98–103	...	...
231,978	Stk	Sept. 5	5	5	M. S. Utility "C." Cons. ...	100–105	...	...
818,657	..	..	4	4	Do. 4 p.c. Cons. Pref.	92–97	...	95–95½
112,126	..	Jan 9	4	4	Do. 4 p.c. Deb. ...	101–103	...	...
148,355	..	..	5	5	Do. 5 p.c. Deb. ...	115–120	...	...
675,000	..	21 May '31	‡6	‡6	Montevideo, Ltd.	35–45	...	...
2,661,315	..	Aug. 8	5½	5	Newcastle & Gateshead Con.	23/6–24/6*d*	+-/3	...
682,856	..	..	4	4	Do. 4 p.c. Pref. ...	97–99*d*	...	...
776,706	..	Jan. 9	3½	3½	Do. 3½ p.c. Deb. ...	89–91*d*	...	...
277,285	..	Nov. 7	5	5	Do. 5 p.c. Deb. '43...	103–107*d*	...	...
274,000	..	Feb. 20	5	5	Newport (Mon.) 5 p.c. max.	98–100a*	...	...
204,940	..	Aug. 22	7½	7½	North Middlesex 6 p.c. Con.	135–145	...	144
396,160	..	Feb. 6	5	5	Northampton 5 p.c. max. ...	98–103	...	...
300,000	..	Dec. 5	7	9	Oriental, Ltd.	112–117	...	115½–116½
205,169	..	Dec. 19	8	8	Plym'th & Stonehouse 5 p.c.	140–150	...	...
504,416	..	Feb. 20	8	8	Portsm'th Con.Stk. 4 p.c.Std.	152–162*	...	158
241,446	..	..	5	5	Do. 5 p.c. max. ...	102–107*	+5	...
114,000	..	Feb. 20	5	5	Preston 5 p.c. Pref.	103–108*	...	...
686,312	..	Jan. 23	4	4	Primitiva 4 p.c. Rd. Db. 1911	82–87	...	...
389,813	..	Dec. 19	4	4	Do. 4 p.c. Cons. Deb.	82–87	...	...
150,000	10	Sept. 19	6	6	San Paulo 6 p.c. Pref. ...	6¾–7¼	...	...
1,736,968	Stk.	Sept. 5	6	6	Sheffield Cons.	114–116*e*	...	...
95,000	..	Jan. 9	4	4	Do. 4 p.c. Deb.	91–95*e*	...	...
133,201	..	Feb. 20	8½	5	Shrewsbury 5 p.c. Ord. ...	125–130*	...	129
90,000	10	June 6	15	15	South African	4–6	...	...
6,709,895	Stk.	Feb. 20	5	7	South Met. Ord.	124–129*	...	126½–128½
1,135,812	..	..	6	6	Do. 6 p.c. Irred. Pf.	138–143*	...	140½–141
850,000	..	..	—	20/-*g*	Do. 4 p.c. Irred. Pf.	101–104*	+1	101½–103
1,895,445	..	Jan. 9	3	3	Do. 3 p.c. Deb. ...	77–81	...	80½–81
1 000,000	..	Jan. 23	5	5	Do. 5 p.c. Red. Deb.	108–113	...	110½
209,820	..	Aug. 8	8½	8½	South Shields Con.	150–155*d*	...	...
1,543,795	..	Feb. 20	6	6	South Suburban Ord. 5 p.c.	122–127*	+1	124½–126
300,000	..	..	5	5	Do. 5 p.c. Pref.	112–117*	...	115–116
868,837	..	Dec. 19	5	5	Do. 5 p.c. Deb.	120–125	...	...
647,740	..	Feb. 20	5	5	Southampt'n Ord. 5 p.c. max.	103–108*	...	...
121,275	..	Dec. 19	4	4	Do. 4 p.c. Deb.	98–103	...	103
350,000	..	Aug. 8	—	9/-	Swansea 5½ p.c. Red. Pref.	110–114	...	...
200,000	..	Dec. 19	6½	6½	Do. 6½ p.c. Red. Deb.	103–108	...	...
1,076,490	..	Aug. 8	6¾	6¾	Tottenham and District Ord.	140–145	+2	140–143
300,000	..	..	5½	5½	Do. 5½ p.c. Pref. ...	120–125	...	...
199,005	..	Dec. 19	4	4	Do. 4 p.c. Deb. ...	98–103	...	...
85,701	..	Sept. 19	6	6	Tuscan, Ltd., 6 p.c. Red. Db.	67–72	...	...
347,769	..	Aug. 22	7	7	Uxbridge, &c., 5 p.c. ...	133–143	...	...
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1,096,373	..	..	5	5	Do. 5 p.c. Pref.	114–119	...	115–115½
1,317,964	..	Dec. 19	5	5	Do. 5 p.c. Deb.	120–125	...	122½
158,400	..	Aug. 22	‡h	5	Winchester W. & G. 5p.c. Con.	107–112	...	...

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Just now Peter's rather important, for this is his first term at school, and he's grappling with the intricacies of "A B C" and "Twice Two": difficult subjects to all men of five-and-a-half, but even more difficult in Peter's case because—bad luck—he's totally blind. That s his One Exception.

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There is a long waiting list of "Peters" throughout the British Isles, for whom training and accommodation must be provided in the immediate future.

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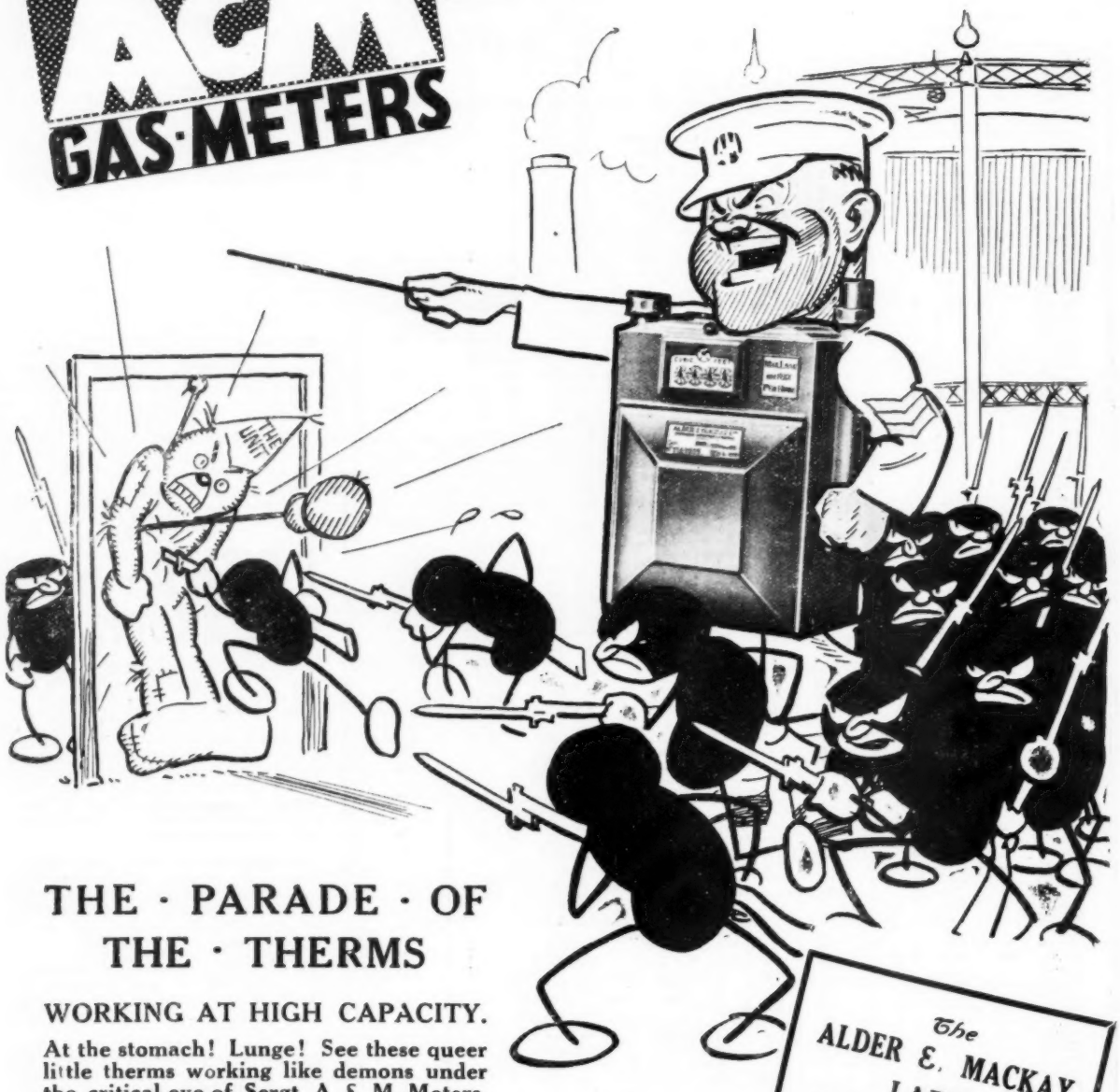

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Absolute reliability and the absolute limit of economy in steam consumption and maintenance are claims which we can make with confidence respecting Holmes-Connersville Exhausters and Boosters. They are admirably adapted to the requirements of modern Gas Works, and may be coupled to any make of totally enclosed steam engines or electric motors.

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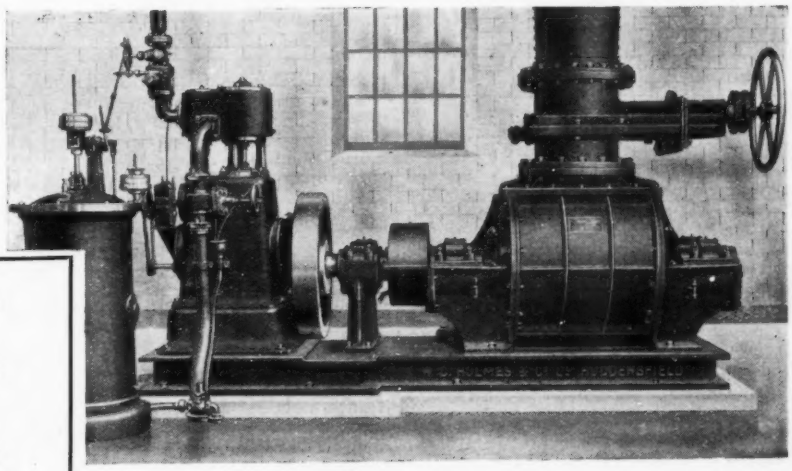

The Holmes-Connersville Exhauster referred to in the testimonials. Installed at a 550 million Works near London, capacity 80,000 cu. ft. of gas per hour.

1930

(*Extract from letter dated 4th February, 1930.*)

Dear Sirs,

HOLMES-CONNERSVILLE EXHAUSTER.

Installed January, 1930.

We have had complete satisfaction during the whole period.

The speed has been varied from very slow to over full capacity, with smooth running, sensitive governing, and practically silent working.

Signed by the Chief Engineer.

1933

(*Extract from letter dated 17th February, 1933.*)

Dear Sirs,

The Holmes-Connersville Exhauster which you fixed at these works in January, 1930, has been in almost continuous use ever since, with considerably varying loads, and has consistently functioned efficiently and satisfactorily.

Signed by the Chief Engineer.

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